REPORT ON AMBIENT AIR SURVEY
IN
ESPANOLA

ARB-TDA REPORT. No. 11-80

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The Honourable
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Minister

Graham W. S. Scott, Q.C.,
Deputy Minister

AIR RESOURCES BRANCH

Technology Development and Appraisal Section

Monitoring and Instrumentation Development Unit

ARB - TDA Report No. 11-80

REPORT ON
AMBIENT AIR SURVEY
IN
ESPANOLA

July, 1978

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01. SUMMARY

As requested by the Northeastern Region, the Monitoring and Instrumentation Development Unit of the Air Resources Branch conducted an ambient air pollution survey in the town of Espanola during July 1978. The purpose of this survey was to monitor reduced sulphur compounds, sulphur dioxide and suspended particulates in the vicinity of the E.B. Eddy Forest Products Limited Plant of Espanola. Data on several other gaseous pollutants was gathered as well. Approximately 85 hours of data were accumulated and analyzed.

Prevailing winds during the survey were light and southerly, probably because of the lake breeze effect from northern Georgian Bay and the North Channel. Four frontal systems moved through the area (July 8, 10, 14 and 15) during this period. The air masses were, however, generally cool, dry and stable so that little precipitation occurred.

For all sampling periods, the mean maximum half-hour average concentration of total reduced sulphur (TRS), expressed as hydrogen sulphide (H_2S), was determined to be 0.030 ppm H_2S. The half-hour Ontario Guideline for TRS of 0.027 ppm H_2S was exceeded during 6 of the 17 sampling periods for a total of approximately 8 hours. The largest maximum half-hour average concentration of TRS was 0.120 ppm H_2S and occurred during the cold front passage on July 15th.

Half-hour average concentrations of sulphur dioxide (SO_2) did not exceed the Ontario Standard of 0.30 ppm at any time during the survey. The maximum ground-level concentration of SO_2 for a half-hour period was 0.09 ppm, while the mean maximum half-hour average concentration was 0.018 ppm.

Half-hour average concentrations of the oxides of nitrogen (NO_x) did not exceed the Ontario Standard of 0.27 ppm at any time during the survey. The largest maximum half-hour average concentration of NO_x during the entire survey was 0.11 ppm.

Ozone (O_3) was detected in relatively low concentrations during this survey. The largest half-hour average concentration measured was 0.096 ppm, comparable to but less than the Ontario Standard of 0.100 ppm. Only 2 of the 15 reported sampling periods showed maximum half-hour average concentrations greater than 0.051 ppm; however, each of those sampling periods had mean concentrations greater than the 1-hour Criterion of 0.08 ppm.

Thirty-eight samples of Total Suspended Particulate (TSP) matter were collected from a network of 4 Hi-Volume air samplers. Only 2 of the samples had TSP loadings in excess of the Air Quality Criterion of 120 ug/m^3, based on a 24-hour sampling period. The mean percentage of TSP in the form of carbon was 18%, and 48% of that was in the free (elemental) form. The remaining 52% of carbon in the bound form (carbonates, organics) gave an indication of the level of carbonates in the ambient air.

The Hi-Volume samples were also analyzed for total water-soluble sulphates ($SO_4^=$) and nitrates (NO_3^-). Periods of maximum and minimum loading of $SO_4^=$ and NO_3^- coincided with periods of maximum and minimum loading of TSP. The maximum $SO_4^=$ loading for a 24-hour period was 41.6 ug/m^3, whereas the maximum NO_3^- loading was 5.2 ug/m^3. There was a significant positive correlation between $SO_4^=$ and NO_3^- mass concentrations which, together with wind direction data, points to long-range transport from the south and southwest as a source of $SO_4^=$ and NO_3^- in the ambient air of Espanola.

With a few assumptions, an estimate of the local contribution to $SO_4^=$ levels can be made. Poor dispersion conditions may allow local sources to contribute up to 25 ug/m^3 of $SO_4^=$ to the ambient air, but a range of 4 to 8 ug/m^3 is more likely under normal conditions within 1 km of the most probable source, the kraft pulp and paper mill.

A total of 19 samples of suspended particulate matter were collected on Delbag Microsorban filters at two of the Hi-Volume sampling sites. Analyses for sodium (Na) and calcium (Ca) content showed that roughly equal concentrations of Na and Ca compounds impinged at the two sites over the whole survey period. A clear correspondence was observed between wind direction and the Na loading at each site. The loading was usually larger when the sampling site was downwind of the E.B. Eddy Forest Products Limited Plant.

02. INTRODUCTION

As requested by the Northeastern Region, the Monitoring and Instrumentation Development Unit of the Air Resources Branch conducted an ambient air pollution survey in the town of Espanola during July, 1978.

The kraft pulp and paper mill owned by E.B. Eddy Forest Products Limited at Espanola was the suspected major source of ambient air pollution. The kraft pulping process generally results in the formation of malodorous sulfur compounds such as methyl mercaptan (CH_3SH), dimethyl sulphide ($(CH_3)_2S$), dimethyl disulphide ($(CH_3)_2S_2$), and hydrogen sulphide (H_2S), collectively known as total reduced sulphur (TRS). Analytical instrumentation available for the survey period was sensitive to each of the compounds mentioned above; however, it was not possible to resolve the instrument response into separate contributions by each compound. Sulphur dioxide (SO_2) may also be released to the atmosphere in significant amounts, depending upon the details of the kraft mill operation.

In addition to SO_2 and TRS, gaseous pollutants monitored were oxides of nitrogen (NO_x), ozone (O_3) and total hydrocarbons (methane and non-methane components).
The NO_x, O_3 and hydrocarbons were not suspected of originating from the kraft mill operation, but were monitored to provide an overall view of ambient air quality in Espanola. Ground-level concentrations of the gaseous pollutants were determined by instrumentation housed in a mobile air monitoring vehicle.

Certain sections of the kraft mill can emit quantities of particulate matter to the atmosphere, including sodium sulphate (Na_2SO_4), sodium carbonate (Na_2CO_3) and calcium carbonate ($CaCO_3$). Information was gathered on the mass concentrations and composition of airborne total suspended particulates (TSP) with Hi-Volume air sampling in the vicinity of the mill.

03. SOURCE DESCRIPTION

The E.B. Eddy Forest Products Limited mill is in the northern sector of the town of Espanola. Espanola is located 3 km south of the junction of highways #68 and #17 and approximately 90 km west of Sudbury. The mill is situated on the south bank of the Spanish River at the highway #68 river bridge. Espanola is roughly 20 km north of the large expanse of water comprising northern Georgian Bay and the North Channel, which is close enough for the town to be subject to the lake breeze effect. For this reason, the prevailing winds during the survey were light and southerly; without exception, however, the winds were calm during the night-time hours.

The terrain south of the mill site is essentially flat except for buildings in the central area of Espanola. The Spanish River follows an east-west course at the northern edge of the mill site, but caused only a small wind channelling effect during the survey. A generally hilly area lies to the north of the mill site and probably serves as a barrier to low-level emissions being carried in that direction. Some channelling of the wind was observed along the railway line which runs north from the mill site through a narrow corridor in the hills towards the community of McKerrow on Highway #17. Instantaneous concentrations of pollutants in McKerrow during the survey, however, were never large enough to warrant monitoring for any length of time.

The mill consists of a kraft pulp mill, two bleaching plants, two Kamyr machines for forming the bleached pulp into marketable product, and two paper machines.

All monitoring sites were referenced to the recovery boiler stacks located approximately in the center of the mill complex (UTM - coordinates 04408-51238). See Map #1 on page 7.

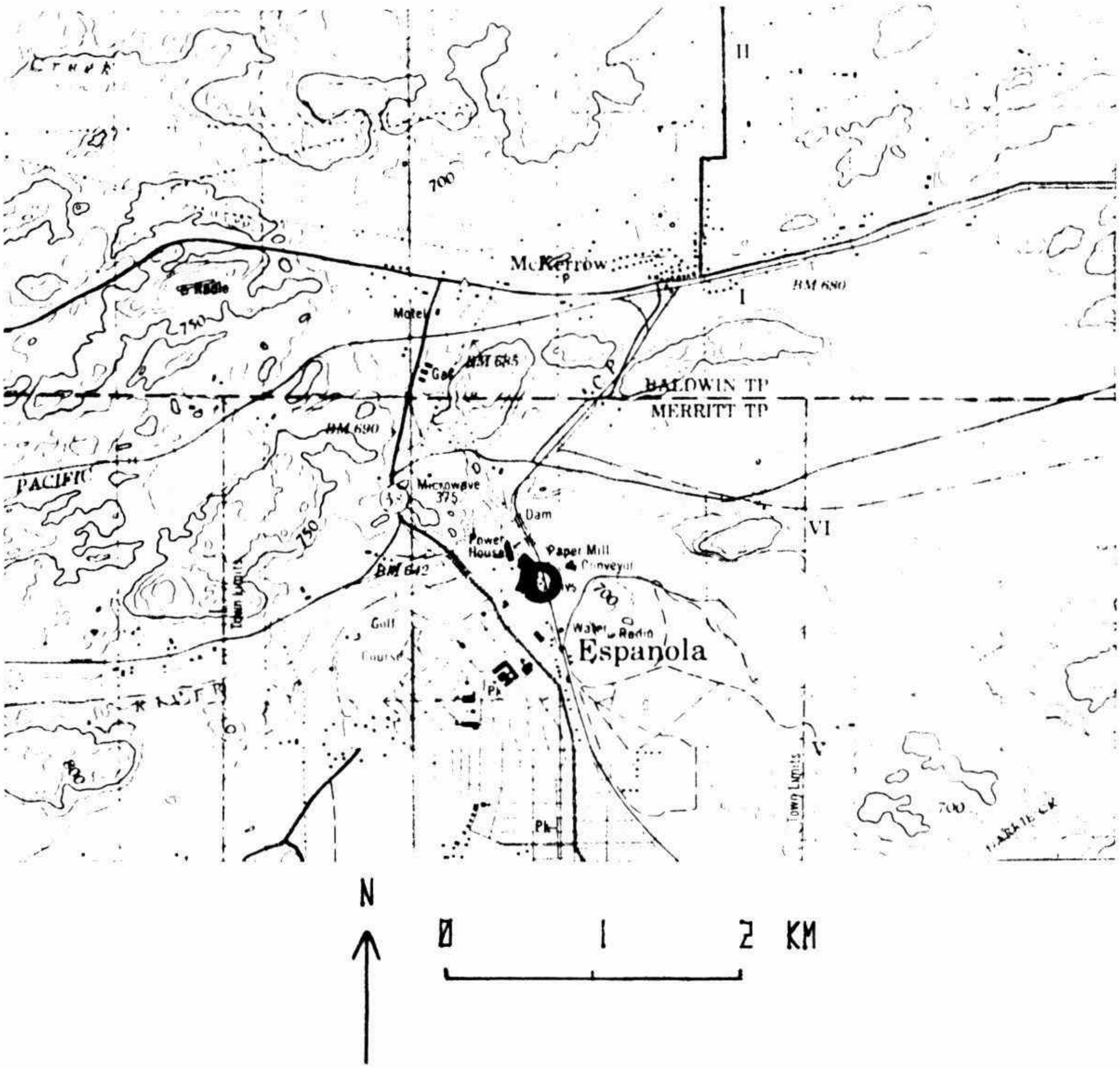
E.B.EDDY FOREST PRODUCTS LIMITED

ESPANOLA, ONTARIO

SOURCE

RECOVERY BOILER STACKS

CO-ORDINATES (04408-51238)



04. MONITORING TECHNIQUE

Instrumentation -

Instrumentation housed in a 1975 General Motors Corporation Transmode was utilized to monitor the gaseous emissions from the E.B. Eddy kraft pulp mill. This unit is equipped with an automated data acquisition system (Hewlett & Packard 9830A mini-computer) and 2 on-board gasoline motor electric generators for fully automated, independent and continuous monitoring capabilities. The HP 9830A mini-computer performed preliminary data analyses in the field to ensure accuracy and validity; however, the final data reduction and analyses were carried out by a larger computer system located within the Air Resources Branch at 880 Bay Street, Toronto.

This mobile air monitoring (MAM) unit has permanently installed analyzers for monitoring sulphur dioxide, hydrogen sulphide, oxides of nitrogen, total hydrocarbons, methane, ozone and carbon monoxide. Meteorological instruments for monitoring wind speed, wind direction, relative humidity, temperature, barometric pressure and solar radiation are also included to form the complete instrumentation package. See Table 1, page 10 for listing of the above.

Sample Collection -

Continuous ambient air samples were taken at a constant flow rate (approximately 200 litre min^{-1}) by a probe located on top of the MAM unit. The probe inlet was approximately 5 metres above ground level. The air sample entered a manifold to which each analyzer was separately connected with a minimal length of teflon sampling line. This arrangement ensured little or no sample degradation, minimal delay time and minimal sample contamination due to ground-level sources (e.g., entrained soil, vehicular traffic, etc.)

The MAM unit was always oriented during sampling periods in such a manner that the existing winds carried the emissions from the generator motors exhausts away from the sampling probe inlet. The vehicle engine was always shut off during sampling periods.

Collection of airborne suspended particulate matter was accomplished with Hi-Volume air sampling techniques. A device employing the vacuum cleaner principle was used to pull ambient air continuously through a glass fibre or Delbag-Microsorban filter, depending upon the pollutants of interest. A flow controller was used to maintain the ambient air volume sampling rate at 1.13 m^3 min^{-1}.

Meteorological Data -

Local meteorological conditions were monitored continuously by the instrumentation contained in the MAM unit and listed in Table 1b. Additional meteorological information (e.g., large scale air mass movements) was obtained from the Atmospheric Environment Service of Canada.

Calibration -

The analyzers and calibration sources were calibrated before the survey. During the survey, the analyzer calibrations were checked at least once every day using the calibration sources and built-in electronic circuitry. The calibrations remained within the prescribed limits throughout the duration of the survey.

TABLE 1

INSTRUMENTATION - GMC TRANSMODE

a) Continuous Analyzers and Calibration Sources:

Instrument	Manufacturer	Analytical Principle	Maximum Sensitivity (Full Scale)
H_2S Source	Hartmann & Braun (H&B Prüfgasgenerator)	-	-
H_2S Analyzer	H & B Picos	electrochemical	0.05 ppm
SO_2 Source	H&B Prüfgasgenerator	-	-
SO_2 Analyzer	H & B Picoflux 2	conductometric	0.3 ppm
O_3 Analyzer/Source	Bendix 8002	chemiluminescent	0.05 ppm
NO_x, NO_2, NO Analyzer	Bendix 8101-B	chemiluminescent	0.5 ppm
CO Analyzer	H & B Uras 2T	Infrared Absorption	50 ppm
THC, CH_4, THC-CH_4 Analyzer	Ingenieur - Produktions-Gruppe München (IPM) RS-5	Dual flame ionization detector	50 ppm THC (as CH_4)
CO, THC, THC-CH_4 CH_4 Source	Matheson	compressed gas	-

b) Meteorological Instrumentation:

Instrument	Manufacturer	Scale
Wind Speed*	Lambrecht gmBH	km/hr
Wind Direction*	Lambrecht gmBH	degrees
Temperature	Weather Measure (WM) T621	C
Relative Humidity	WM-HM-IIIP	percentage
Barometric Pressure	WM-BM70-B242	millibars
Solar Radiation	WM Star Pyranometer	watts/cm^2

* These wind indicators are located on top of a 10 metre retractable mast.

05. SURVEY TECHNIQUE

The gas analyzers employed in this survey were subject to a warm-up period and calibration each morning during the survey. After waiting approximately 1/2 hour for the residual analyzer response to calibration to disappear, the MAM unit was ready to measure pollutant levels in the ambient air.

The approximate locations of the points of impingement zones were determined by communication with observers in 2 other motor vehicles. The visible and frequently malodorous plume was usually easy to locate and ambient air monitoring was initiated on those occasions when the impingement zone was accessible by the MAM unit. Air quality was continuously monitored for at least 45 minutes at each location and, whenever possible, monitoring was undertaken farther downwind as well.

Six standard Hi-Volume samplers were used to determine mass concentrations of total suspended particulate matter (TSP). The samplers were located at several distances and directions from the source investigated (see Table 3, page 17). Glass fibre filters were used as the collection media on four of the samplers and were analyzed later for TSP, total carbon, sulphates and nitrates. Delbag Microsorban filters were used on the other two samplers and they were analyzed later for sodium and calcium content. As shown in Tables 4a to 4e, 47 of the 57 filters sampled the ambient air for 24 hours ± 2%. The 10 remaining sampling periods differed from 24 hours by less than 5%.

06. MONITORING SITE LOCATIONS

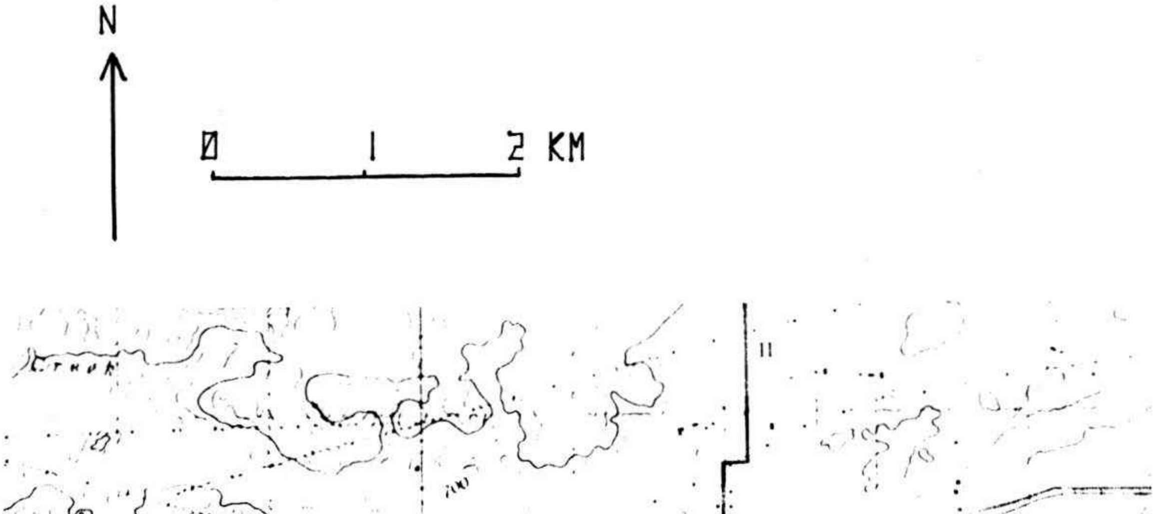
The approximate locations of the ambient air monitoring sites are shown in Map #2 (page 13) and their associated descriptions are presented in Table 2 in chronological order. Approximately 85 hours of valid data were accumulated at these 22 reported monitoring sites.

Hi-volume sampling sites are shown on Map #3 (page 16) and Table 3 (page 17) contains the complete descriptions of those sites.

E.B.EDDY FOREST PRODUCTS LIMITED

ESPANOLA, ONTARIO

MONITORING SITES



MAP #2

TABLE 2

MOBILE AIR MONITORING SITES

ESPANOLA - 1978

SURVEY #	SAMPLING SITE	LOCATION, UTM COORDINATES * *	DISTANCE * (KM)	BEARING * (DGS)	DATE 1978
3	E	Airport Rd., 0.2 km S. of Old Nairn Rd. (04435-51240)	2.7	080	July 5
4	F	Old Nairn Rd. & Railway Crossing (04408-51246)	0.9	350	July 6
5	G	Old Nairn Rd., 0.8 km E. of Railway Crossing (04414-51245)	0.9	040	July 6
6	F	Old Nairn Rd. & Railway Crossing (04408-51246)	0.9	350	July 6
7	H	Old Nairn Rd.,1.0 km E. of Railway Crossing (04415-51244)	1.0	040	July 6
9	I	Old Nairn Rd., 0.5 km E. of Railway Crossing (04410-51245)	0.8	020	July 7
12	U	Park and Centre Sts. (04407-51233)	0.5	185	July 8
18	K	Second Ave., Opposite #99 (04417-51227)	1.2	160	July 11
19	J	Goodman Motel, Hwy #17 (04401-51228)	2.0	340	July 11
21	L	Old Nairn Rd., 0.1 km E. of Creek (04424-51246)	1.6	070	July 12
22	F	Old Nairn Rd. & Railway Crossing (04408-51246)	0.9	350	July 12
24	M	Airport Fence (04436-51240)	2.7	080	July 13
26	N	Old Webbwood Rd. (04385-51234)	2.3	260	July 14

TABLE 2

MOBILE AIR MONITORING SITES

ESPANOLA - 1978

SURVEY	SAMPLING SITE	LOCATION, UTM COORDINATES **	DISTANCE * (KM)	BEARING * (DGS)	DATE 1978
27	O	Old Webbwood Rd. & Hwy. #68 (04399-51242)	1.2	300	July 14
28	I	Old Nairn Rd. (04410-51245)	0.8	020	July 14
29	P	MTC Depot on Hwy. #17 (04431-51261)	3.3	040	July 14
30	F	Spring on Old Nairn Rd. (04408-51246)	0.8	010	July 14
31	Q	Second St., 1.0 km E. #99 (04424-51227)	2.0	135	July 15
33	H	Old Nairn Rd., 1.0 km E. of Railway Crossing (04415-51244)	1.0	040	July 15
35	R	Station Rd., near Beaver Lumber (04409-51232)	0.8	170	July 15
36	S	School at Mead and Scollard Sts. (04404-51228)	1.1	210	July 15
37	T	Thornloe & Read Sts. (04408-51229)	0.9	180	July 16

* Distance and bearing from the pulp mill recovery boiler stacks.

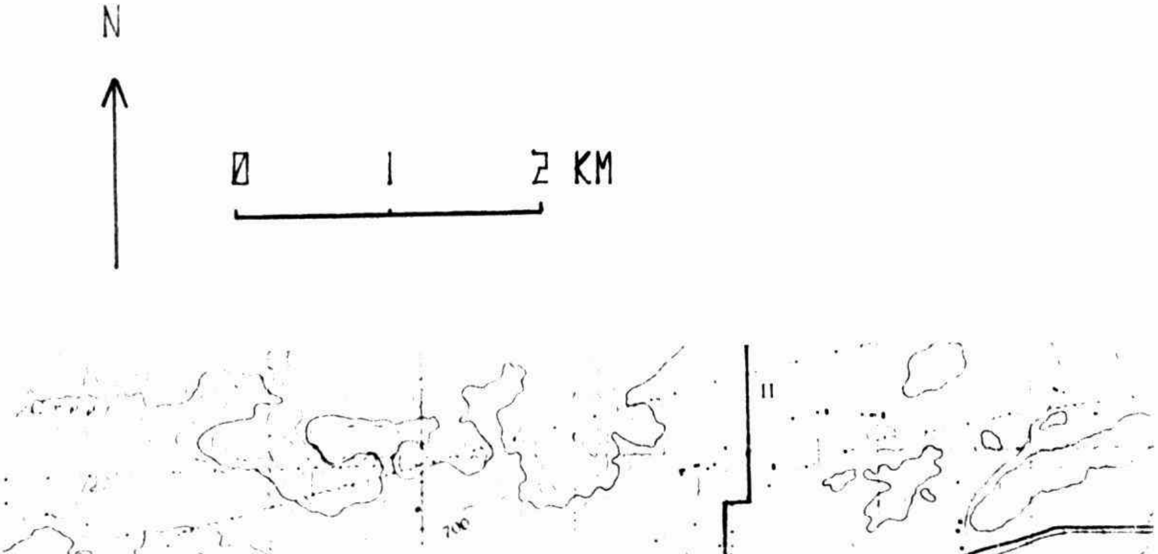
** Taken from map identified as:

SERIES	A 751
MAP	41-I/5
EDITION	3 MCE

E.B.EDDY FOREST PRODUCTS LIMITED

ESPANOLA, ONTARIO

HI-VOL SITES



MAP #3

TABLE 3

HI-VOLUME SAMPLERS - SITE DESCRIPTION

Site	Filter type	Site Description	Distance and Direction from Pulp Mill
1	glass fibre	McKerrow, lawn-garden area North side of Hwy. #17 (04419-51259)	2.3 km & 025 degrees
2	glass fibre, Delbag Microsorban	Short lane branching S.E. off Old McKerrow Road; lawn of last property; 0.3 km North of Old Nairn Rd. which has dirt surface (04413-51249)	1.2 km & 025 degrees
3	glass fibre, Delbag Microsorban	Downtown Espanola, Post Office roof (04405-51234)	0.5 km & 220 degrees
4	glass fibre	Second Ave., field of last property on South side #99 (04417-51227)	1.5 km & 140 degrees

07. RESULTS

Definition of Terms -

Scan Time:	Time interval for averaging and data logging of instantaneous interrogations of the monitoring instruments by the data acquisition system.
Time:	Time of first and final scans used to determine running averages.
Number of Readings:	Number of scans.
MAM:	Mobile Air Monitoring
MHAC:	Maximum half-hour average concentration for a monitoring period.
glc:	Ground-level concentration.

All statistical values are based on cumulative averages of continual instantaneous interrogations of the analytical instruments, and all results are expressed in parts per million (ppm). Reduced sulphur compounds (TRS) were the gaseous pollutants of primary interest; however, all of the instrumentation in Table 1 was operational during most of the monitoring period.

A statistical summary of the collected data is presented in Tables 5a, 5b and 6, pages 58 through 60 . Supplementing these tables, plots of concentration versus time for TRS, SO_2, O_3 and NO_x are presented in Figures 1 to 9, pages 34 to 42 . The results for CO were disregarded because the CO analyzer malfunctioned during the survey period.

Omissions from the processed data were made as noted by the number scheme for the monitoring periods. The omissions resulted from the following:

i) insufficient data - 45 minutes was deemed the minimum monitoring period in order to establish a "true" 30-minute average concentration of the gaseous pollutant of interest.

ii) instrument failure - mainly data acquisition and data handling problems (cassette tape damage); also, the H_2S analyzer malfunctioned during the period July 8th to 10th and the replacement was not operational until July 13th.

iii) calibration effects - several monitoring periods included the residual instrument response to recently performed calibration.

In order to assist in determining the source location, several wind-rose/concentration analyses were carried out (Figures 10, 11, 12 and 13).

Correlation statistics of total reduced sulphur versus sulphur dioxide are also presented as an aid in source identification (Figure 14).

The concentration and composition of suspended particulate matter in the ambient air were also determined by using Hi-Volume sampler units. The analyzed data is presented in Tables 4a to 4i (pages 49 to 57 inclusive).

A special addendum to this report entitled, "Ambient Air Survey in Espanola - 1978; Compilation of Time Averaged Data", is attached.

08. DISCUSSION

Ambient air monitoring of ground-level concentrations (glc) of gaseous pollutants was carried out by the MAM unit in the vicinity of Espanola during the period July 4th - July 16th. Four frontal systems moved through the area (July 8, 10, 14 and 15) during that period but the air masses were generally cool, dry and stable so that little precipitation occurred. Probably due to the lake breeze effect, the prevailing winds during this survey were light and southerly. This is reflected in the fact that the majority of the monitoring sites were located north of the mill site (see Table 2, pages 14 - 15).

An attempt was made to start each monitoring period in an impingement zone and continue recording data for as long as the impingement persisted or for 45 minutes, whatever period was longer. Approximately 85 hours of data were accumulated and analyzed for the 22 monitoring periods reported here.

The following Standards, based on a 30-minute average concentration of gaseous pollutants at the point of impingement, as set out in Schedule 1, Regulation 15 of the Ontario Environmental Protection Act, must be considered when the results of this survey are evaluated.

Pollutant	Standard *
H_2S	0.020 parts per million (ppm)***
SO_2	0.30 ppm
NO_x	0.27 ppm **
O_3	0.10 ppm

* Conversion from ug/m^3 to ppm was made under the following conditions: temperature = 298°K, atmospheric pressure = 101.6 kPa.

** Expressed as concentrations of NO_2.

*** The H_2S analyzer used in the MAM unit is also sensitive to methyl mercaptan, CH_3SH, and to compounds containing HS^- group, such as dimethyl sulphide, $(CH_3)_2S$, and dimethyl disulphide, $(CH_3)_2S_2$. The recorded data is therefore a measurement of total reduced sulphur and must be compared with the Provincial Guideline for TRS of 0.027 ppm, instead of the H_2S Standard of 0.020 ppm. Since it is highly probable that H_2S is the predominant component of the gaseous emissions from the E.B. Eddy Forest Products Ltd. Mill, all results in this report are expressed as concentrations of hydrogen sulphide.

TOTAL REDUCED SULPHUR (TRS) - expressed as hydrogen sulphide

TRS was monitored at 17 sites during the survey for a total of 68 hours. A check of the concentration plots shows that the MHAC exceeded 0.027 ppm H_2S during 6 of the monitoring periods (#'s 9, 24, 33, 35, 36, 37) for a total of approximately 8 hours.

The mean MHAC of TRS for the 17 sites was 0.030 ppm H_2S. This number is strongly influenced by the results of site #35 on July 15th, 1978. This site was on Station Rd. in the parking lot of Beaver Lumber, in downtown Espanola. The concentration plot of Figure 7 reveals that a half-hour average concentration of approximately 0.1 ppm H_2S was maintained for most of the 2-hour monitoring period, with an MHAC of 0.120 ppm H_2S. The maximum instantaneous concentration of TRS for the entire survey occurred during this monitoring period and reached a value of 0.246 ppm H_2S. See Tables 5a and 5b.

A cold frontal passage occurred on July 15, 1978 in the Espanola area and caused plume impingement in the downtown sector. The meteorological instrumentation of the MAM unit recorded a decrease in temperature, an increase in relative humidity, an increase in barometric pressure, a veer in the wind direction from the SW to the N, and an increase in wind speed from 5 km/hr to 15 km/hr. The ensuing vertical turbulence associated with this cold front caused extreme mixing in the lower atmosphere and "looping" of the plume resulted. This condition persisted for a period of approximately 2 hours during which the high concentrations of TRS were detected at site #35.

After the passage of the cold front, the turbulence lessened and the wind speed decreased to 3-4 km/hr. Monitoring period #36 obtained results showing that the plume impinged at ground level infrequently thereafter. The Guideline of 0.027 ppm H_2S was exceeded during most of the time interval 00:00 - 02:00 hrs at site #36 on Mead and Scollard Sts. A maximum instantaneous concentration of 0.093 ppm H_2S was detected and the MHAC was 0.040 ppm H_2S (See Fig. 8 and Table 5b).

There was clearing behind the cold front and the lack of cloud cover during the night of July 15 - 16 together with the presence of this cool singular air mass led to extensive cooling near the earth surface. Subsidence occurred and because of the lower loading potential of the cooler air mass, fumigation occurred in downtown Espanola. Monitoring period #7 (Fig. 9, Table 5b) recorded some high concentrations of TRS due to this feature. The MHAC of TRS was 0.045 ppm H_2S and a maximum instantaneous concentration of 0.186 ppm H_2S was detected. By 10:30 hrs on July 16, surface heating due to solar radiation had caused sufficient vertical turbulence to break up the fumigation. Looping of the plume was observed at a greater distance from the source, but the impingement zone could not be determined and the survey was terminated.

Wind-rose analyses were carried out on the results of monitoring periods #6, 24, 33 and 35 (Figs. 10 to 13). The wind speed and direction throughout each sampling period can be seen on Figs. 2, 4, 6 and 7. Each analysis shows that the greatest concentrations of TRS were detected when the wind direction coincided with the direction of the E.B. Eddy Forest Products Ltd. mill.

SULPHUR DIOXIDE - SO_2

Sulphur dioxide was monitored at 12 sites for a total of 50 hours. The Ontario Standard of 0.30 ppm was not exceeded at any time. The largest MHAC recorded was 0.09 ppm during monitoring period #28, which also produced the maximum instantaneous concentration of SO_2 for the entire survey of 0.10 ppm. The mean MHAC for the 12 monitoring periods was 0.018 ppm.

Although the concentrations of SO_2 in ambient air were relatively small, a correlation plot of TRS vs. SO_2 was carried out to check whether the source of the small amounts of SO_2 coincided with the source of TRS. Figure 14 shows that for the monitoring period #27 there was a large positive correlation (r=0.969) between the TRS and SO_2 concentrations. Such a relationship could also have been predicted by looking at the concentration plot for that period which is presented in Fig. 5.

OXIDES OF NITROGEN - NO_x

Although the E.B. Eddy mill at Espanola was not suspected of being a source of NO_x, the concentration of NO_x at each of the 22 monitoring sites was monitored because the collection of such data by the data acquisition system of the MAM unit was performed automatically and required no extra resources, and because it establishes background levels for the Espanola area for reference in future studies.

The concentration of NO_x is reported here for only 15 sites (Table 6). Those monitoring periods with large concentrations were omitted because they coincided with intervals of very low wind speed; this is strong evidence that the source of NO_x during those periods was the exhaust of the two gasoline-powered generators at the rear of the MAM unit. All of the NO_x data reported here was collected when the wind speed was ≥ 3km/hr.

The largest MHAC of NO_x for the entire survey was 0.110 ppm during monitoring period #12; however, site #12 was in downtown Espanola during late afternoon and the emissions from vehicular traffic were the most probable source. The 2nd largest MHAC of NO_x occurred during monitoring period #6 on Old Nairn Road, approximately 0.9 km north of the mill site. A value of 0.100 ppm was detected.

A clear indication of the negligible contribution by this mill to ambient air levels of NO_x is obtained by looking at the data of monitoring period #35, which produced the largest concentrations of TRS because of its location directly in the path of the looping plume for a period of two hours. The MHAC of NO_x during that period was 0.033 ppm, which is less than the MHAC of NO_x for 9 of the 15 reported sampling periods. In addition, the maximum instantaneous concentration of NO_x recorded during monitoring period #35 was 0.099 ppm, which is still well under the half-hour Standard of 0.27 ppm.

OZONE - O_3

Ozone was detected in relatively low concentrations during this survey and a summary of the analyzed data is presented in Table 6. The only elevated concentrations of ozone occurred on July 6 during monitoring periods #'s 4 and 6. It can be seen that the largest MHAC of ozone was 0.096 ppm at site #6, which is less than the half-hour Standard of 0.100 ppm. However, the mean concentrations for the entire duration of monitoring periods #'s 4 and 6 were greater than the 1-hour Criterion of 0.08 ppm. In addition, Figure #1 indicates that the concentration of O_3 was continually greater than 0.08 ppm throughout monitoring period #6. The wind direction for this period was southwesterly (see Figure#1), which suggests the possibility of long-range transport of ozone from the southwest.

It is interesting that the smallest MHAC of ozone was recorded during monitoring period #35, when the largest MHAC of TRS for the entire survey was recorded. The coincidence of extreme values may be due to the cold front passage during that period. The cold front turbulence which led to the high

TRS values was accompanied by a shift in wind direction from the south-west to the north-west. Any air mass coming from the relatively uninhabited north-west should contain less ozone than an air mass which has passed over the industrialized areas to the south-west.

HI-VOLUME ANALYSES - Particulates

Four Hi-Volume samplers were operated with glass-fibre filters at four different locations to determine total suspended particulate (TSP) mass loadings and the amount present in the form of total carbon, sulphates ($SO_4^=$) and nitrates (NO_3^-). Two of the sites also incorporated samplers that exposed Delbag Microsorban filters to determine mass loadings of sodium (Na) and calcium (Ca).

i) Total Suspended Particulates (TSP) -

The results in Table 4f show that only 2 of the 38 samples were found to have TSP loadings in excess of the Air Quality Criterion of 120 ug/m^3, based on a 24-hour sampling period. The maximum loading of TSP occurred during July 7th at Site #2, when a value of 153 ug/m^3 was obtained.

The two largest TSP loadings at each of the four sites were recorded during the same 2-day period, July 6th and 7th. The winds were generally light and from the south-west on July 6th; atmospheric conditions were very hot, humid and calm on July 7th. The third largest TSP loading at each site occurred during the sampling period of July 12th, when the winds during daylight hours were from the south and south-east at 15 km/hr.

As expected, the TSP loadings were least at sites #'s 1, 2 and 4 when the winds were from the north-east. On July 8th, those sites recorded their minimum values for the survey and the winds were northerly at 10 km/hr.

ii) Carbon (total and free) -

The mass concentration of total carbon was in the range 3.4 to 11.6 ug/m^3, yielding an average of 6.4 ug/m^3 based on a 24-hour sampling period. The mean percentage of TSP in the form of total carbon was 18%. The percentage was least when the TSP loading was greatest.

Table 4g shows the amount of free carbon (i.e., coal, coke and graphite) in each sample. The maximum loading of free carbon in a 24-hour period was 5.53 ug/m^3 at the Post Office site on July 6th. On the average, 48% of the total carbon was in the form of free (elemental) carbon which is generally associated with a combustion process.

The remaining 52% of the total carbon was mainly in the form of carbonates with a small amount of organic compounds. Carbonates are one of the particulate forms to be expected as emissions from a kraft pulping process.

A consideration of the wind direction and the levels of carbon in carbonate form reveals that July 6th and 7th were the only days when the carbonate levels exceeded background levels of approximately 15 - 25 ug/m^3 (mass CO_3 = 5 x mass C). A maximum glc of approximately 35 ug/m^3 was reached at the Post Office site during the hot and humid conditions of July 7th. The relative maximum of bound C at Site #2 on July 10th does not correlate positively with any of the other particulate components, so it may have been due to an organic substance such as entrapped insects or vegetation.

iii) Sodium (Na), Calcium (Ca) -

The loadings of sodium and calcium at Hi-Vol Sites #'s 2 and 3 are presented in Table 4h. Average loadings for the whole survey period at Site #2 were not significantly different from those at Site #3. At each site the ratio of calcium to sodium loading was roughly equal to the ratio of their atomic weights, which means that an approximately equal number of gram moles of sodium and calcium compounds impinged at those sites over the whole survey period.

An average wind speed and direction is shown in Table 4h for each of the Hi-Volume sampling periods. This information was obtained by the MAM Unit during the monitoring of gaseous pollutants carried out on those days. The information is generally indicative of wind conditions only during the hours of daylight. Sites #2 and #3 are on opposite sides of the kraft mill site; this fact makes it easier to detect a clear correspondence between the wind direction and the loading of sodium at each site. The loading was usually larger when the Hi-Volume site was downwind from the mill site. Conditions of calm or low wind speed gave results at Site #2 similar to those at Site #3. The loading of calcium at Site #3 shows less dependence on wind direction.

iv) Sulphates ($SO_4^=$), Nitrates (NO_3^-)

The glass-fibre filters were analyzed for sulphate ($SO_4^=$) and nitrate (NO_3^-) content, and the results are shown in Table 4i. The two largest loadings of $SO_4^=$ at each site occurred on the same two days, July 6th and 7th, that the largest TSP loadings were experienced. The maximum $SO_4^=$ loading for a 24-hour period was 41.6 ug/m^3 at the Post Office site on July 7th.

The fact that Site #3 and Site #4, which are south of the mill site, experienced some of their largest mass concentrations of $SO_4^=$ for south or south-west winds indicate that long-range transport of $SO_4^=$ from the south and south-west may have been significant for the Espanola area.

An estimate of the local contribution to $SO_4^=$ concentrations can be obtained if some assumptions are made. Assume first that the concentrations of $SO_4^=$ due to long-range transport were identical at all sites on July 6th and 7th. Then assume that the local $SO_4^=$ contribution was identical on those two days as well, but that the difference in $SO_4^=$ levels at each site was only due to the poor dispersion conditions (hot and calm) existing on July 7th. The reason for the different levels between sites on each day should primarily be the different distances from the pulp mill to each site.

An upper limit to the contribution by long-range transport can be approximated by the July 6th $SO_4^=$ level at Site #4 (17 ug/m^3) because of its location upwind from the pulp mill. The $SO_4^=$ level at Site #3 on July 7th (41.6 ug/m^3) then provides an indication of the local $SO_4^=$ contribution

(41.6 - 17 = 24.6 ug/m^3) under poor dispersion conditions at a distance of 0.5 km from the most probable source, the pulp mill.

By considering the wind conditions and $SO_4^=$ levels at Sites #2 and #3 on July 8th, 9th and 12th, an estimate of the local $SO_4^=$ contributions can be made in the range 4 to 8 ug/m^3 under more probable dispersion conditions.

Although the NO_3^- loading was much less than the $SO_4^=$ loading, a general pattern for the NO_3^- results could still be discerned. Each of the four sites experienced its maximum NO_3^- loading on July 6th, with the largest being 5.2 ug/m^3 at the Post Office site. All four sites experienced a period of minimum NO_3^- (and $SO_4^=$) loading from July 8th through July 11th.

The results in Table 4i are also shown in Figure 15. A least-squares linear regression and statistical analysis were carried out to determine the degree of correlation between sulphates and nitrates. The correlation coefficient between the 2 sets of data is r = 0.657, which is significant at a 0.01 level (99% confidence level) for the 37 data points. This result does not imply that a causal relationship exists between $SO_4^=$ and NO_3^-, but lends support to the possibility that much of the $SO_4^=$ and NO_3^- originated from the same sources. Since the Kraft pulping process is a known source of $SO_4^=$ but not of NO_3^-, the common source of $SO_4^=$ and NO_3^- in Espanola may have been long-range transport from the south and south-west rather than the kraft pulp mill in Espanola.

09. CONCLUSIONS

Total reduced sulphur (TRS) compounds, believed to be mainly hydrogen sulphide (H_2S), were the only gaseous pollutants detected in significant quanitities in the ambient air of Espanola during the survey. Half of the monitoring periods with excessive TRS for a half-hour interval were directly related to a particular weather phenomenon, the passage of a cold front. The large amount of turbulence resulting from the cold frontal passage caused the plume from the kraft pulp mill to "loop" and impinge at ground-level relatively close to the mill site. The cold air mass which followed the cold front caused extensive cooling near the earth surface, which led to the occurrance of a fumigation in the Espanola area.

The other gaseous pollutants being monitored, SO_2, NO_x, O_3, methane and non-methane components of total hydrocarbons, were detected in the ambient air of Espanola in concentrations less than their respective Standards or Criteria.

The Hi-Volume air sampling results showed the largest TSP values for the 2 sites closest to the kraft mill; however, the kraft mill was not a significant source of TSP since only 2 of the 38 samples exceeded the 24-hour Air Quality Criterion of 120 ug/m^3 and the overall arithmetic mean for the survey period was only 45 ug/m^3.

The mass concentrations of sodium and calcium in the ambient air showed that, over the whole survey period, an approximately equal number of moles of each element in compound form had impinged at each of 2 Hi-Volume sampling sites on opposite sides of the kraft mill. There was a clear correspondence between the wind direction and the mass concentration of sodium at each site. The mass concentration was usually larger when the Hi-Volume site was downwind from the kraft mill site. The results for calcium showed less dependence on wind direction.

The largest mass concentrations of sulphates ($SO_4^=$) and nitrates (NO_3^-) were recorded on those days having the largest TSP mass concentrations. Based upon the correlation between sulphate and nitrate levels, and upon the relationship between sulphate levels and wind direction, it is highly probable that a large percentage of the sulphates and nitrates in the ambient air of Espanola was due to long-range transport from the south and south-west. Local contributions to $SO_4^=$ levels can be estimated to be in the range of 4 to 8 ug/m^3 under normal dispersion conditions, but may be as high as 25 ug/m^3 under very poor dispersion conditions.

Mass concentrations of total carbon were in the range 3.4 to 11.6 ug/m^3. Approximately 52% of the total carbon was in the form of carbonates (CO_3) which are one of the particulate forms to be expected as emissions from a kraft pulping process. Carbonate levels only exceeded the background levels of approximately 15 - 25 ug/m^3 on two days during the survey (July 6th and 7th).

10. APPENDIX

A. Concentration/Time Graphs:

Monitoring period # 6 - TRS, SO_2 and O_3 - Figure 1
" " # 6 - TRS, NO_x and O_3 - Figure 2
" " # 9 - TRS, SO_2 and O_3 - Figure 3
" " #24 - TRS, NO_x and O_3 - Figure 4
" " #27 - TRS, SO_2 and O_3 - Figure 5
" " #33 - TRS, NO_x and O_3 - Figure 6
" " #35 - " " " - Figure 7
" " #36 - " " " - Figure 8
" " #37 - " " " - Figure 9

B. Wind Roses:

Monitoring period # 6 - TRS and wind dir.- Figure 10
" " #24 - " " " " - Figure 11
" " #33 - " " " " - Figure 12
" " #35 - " " " " - Figure 13

C. Correlation Statistics:

Monitoring period #27 - TRS versus SO_2 - Figure 14
Survey Hi-Vol results - $SO_4^=$ versus NO_3^{2-} - Figure 15

D. Statistical Summary Tables:

Hi-Volume Results - Particulates - Tables 4a - 4i

TRS and SO_2 concentrations - Tables 5a, 5b

O_3 and NO_x concentrations - Table 6

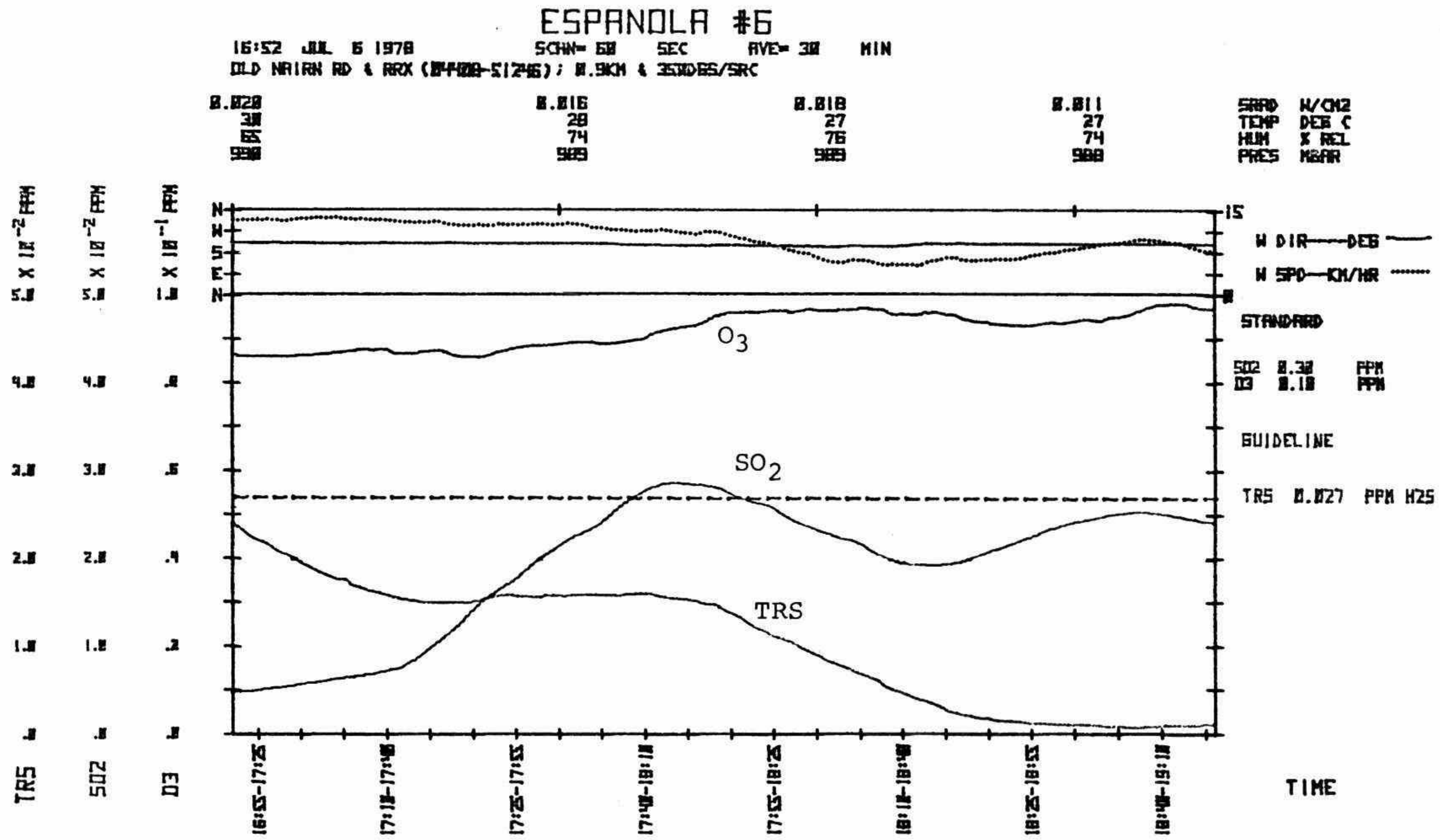

ESPANOLA #6
16:52 JUL 6 1978
SCHN= 60 SEC
AVE= 30 MIN
OLD NAIRN RD & ARX (04400-51246); 0.9KM & 350DEG/SRC
0.020 30 65 990
0.016 28 74 989
0.018 27 76 989
0.011 27 74 988
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
5 X 10^{-2} PPM
5 X 10^{-2} PPM
1 X 10^{-1} PPM
N
W
S
E
N
15
0
W DIR——DEG
W SPD——KM/HR
STANDARD
SO2 0.30 PPM
O3 0.10 PPM
GUIDELINE
TRS 0.027 PPM H2S
O_3
SO_2
TRS
5.0 5.0 1.0
4.0 4.0 .8
3.0 3.0 .6
2.0 2.0 .4
1.0 1.0 .2
.0 .0 .0
TRS
SO2
O3
16:55-17:25
17:10-17:40
17:25-17:55
17:40-18:10
17:55-18:25
18:10-18:40
18:25-18:55
18:40-19:10
TIME

Figure 1

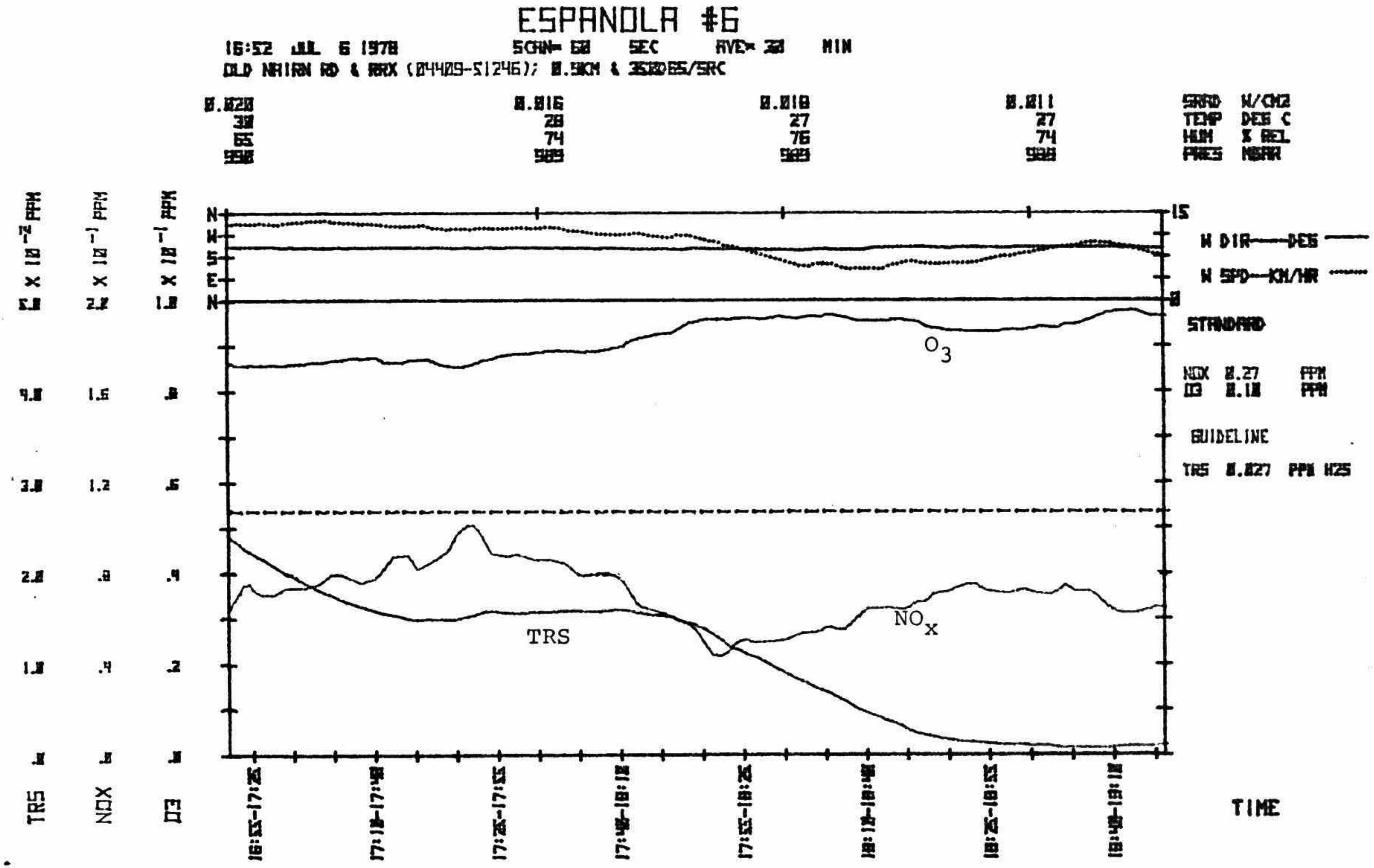

ESPANOLA #6
16:52 JUL 6 1978 SCAN= 60 SEC AVE= 30 MIN
OLD NAIRN RD & AAX (04409-51246); 0.5KM & 350DEG/SRC
0.020 30 65 990
0.016 28 74 989
0.018 27 76 989
0.011 27 74 988
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
W DIR---DEG
W SPD---KM/HR
15
0
STANDARD
NOX 0.27 PPM
O3 0.10 PPM
GUIDELINE
TRS 0.027 PPM H2S
N
W
S
E
N
X 10^-2 PPM
X 10^-1 PPM
X 10^-1 PPM
5.0 2.0 1.0
4.0 1.6 .8
3.0 1.2 .6
2.0 .8 .4
1.0 .4 .2
.0 .0 .0
TRS
NOX
O3
O3
NOx
TRS
16:55-17:25
17:10-17:40
17:25-17:55
17:40-18:10
17:55-18:25
18:10-18:40
18:25-18:55
18:40-19:10
TIME

Figure 2

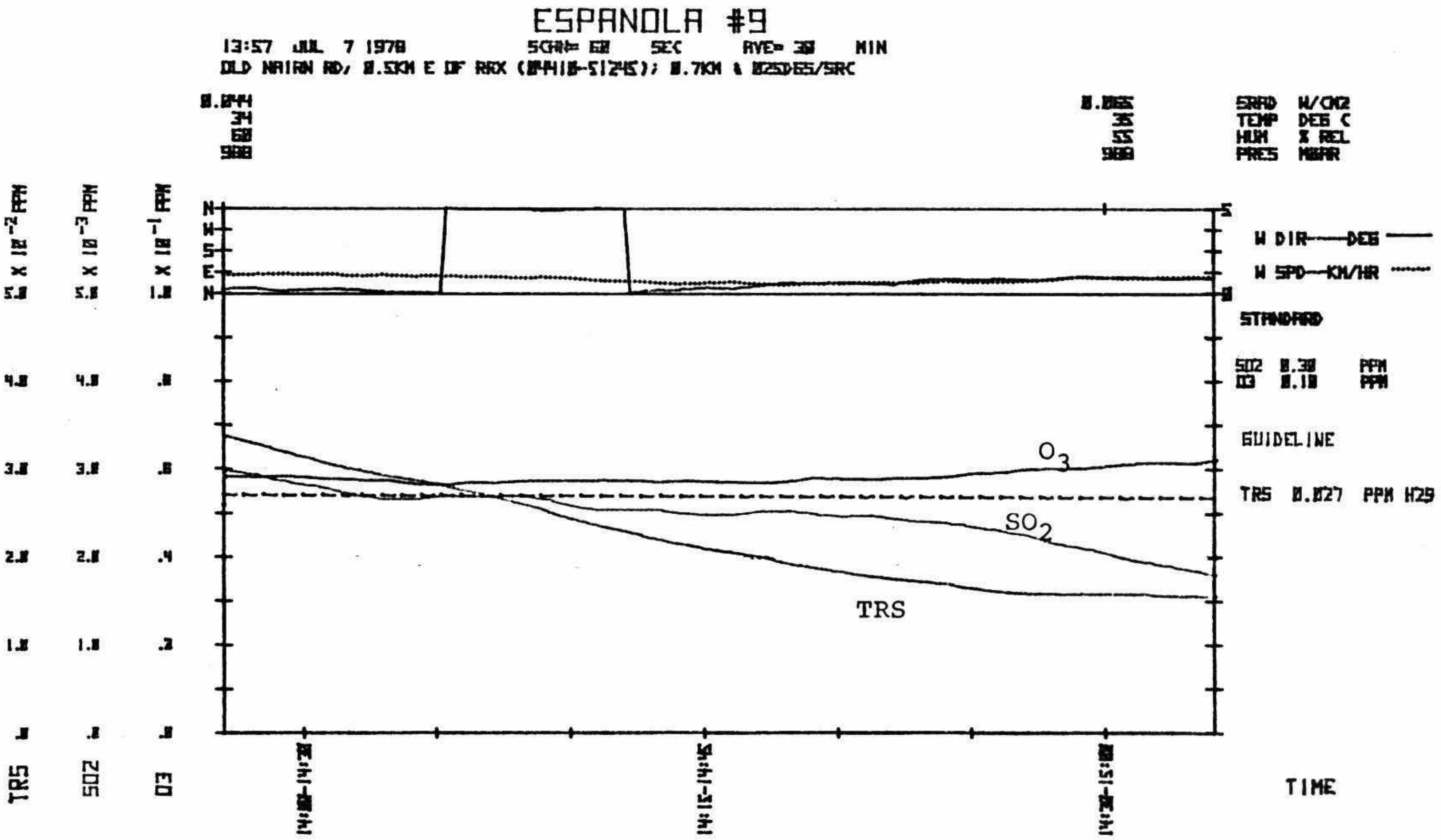

ESPANOLA #9
13:57 JUL 7 1978
SCAN= 60 SEC
AVE= 30 MIN
OLD NAIRN RD, 0.5KM E OF AAX (04410-51245); 0.7KM & 025DEG/SRC
0.044
34
60
900
0.065
35
55
980
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
x 10^-2 PPM
x 10^-3 PPM
x 10^-1 PPM
5.0
5.0
1.0
4.0
4.0
.8
3.0
3.0
.6
2.0
2.0
.4
1.0
1.0
.2
.0
.0
.0
TRS
SO2
O3
N
W
S
E
N
5
0
W DIR----DEG
W SPD---KM/HR
STANDARD
SO2 0.30 PPM
O3 0.10 PPM
GUIDELINE
TRS 0.027 PPM H2S
O3
SO2
TRS
14:00-14:30
14:15-14:45
14:30-15:00
TIME

Figure 3

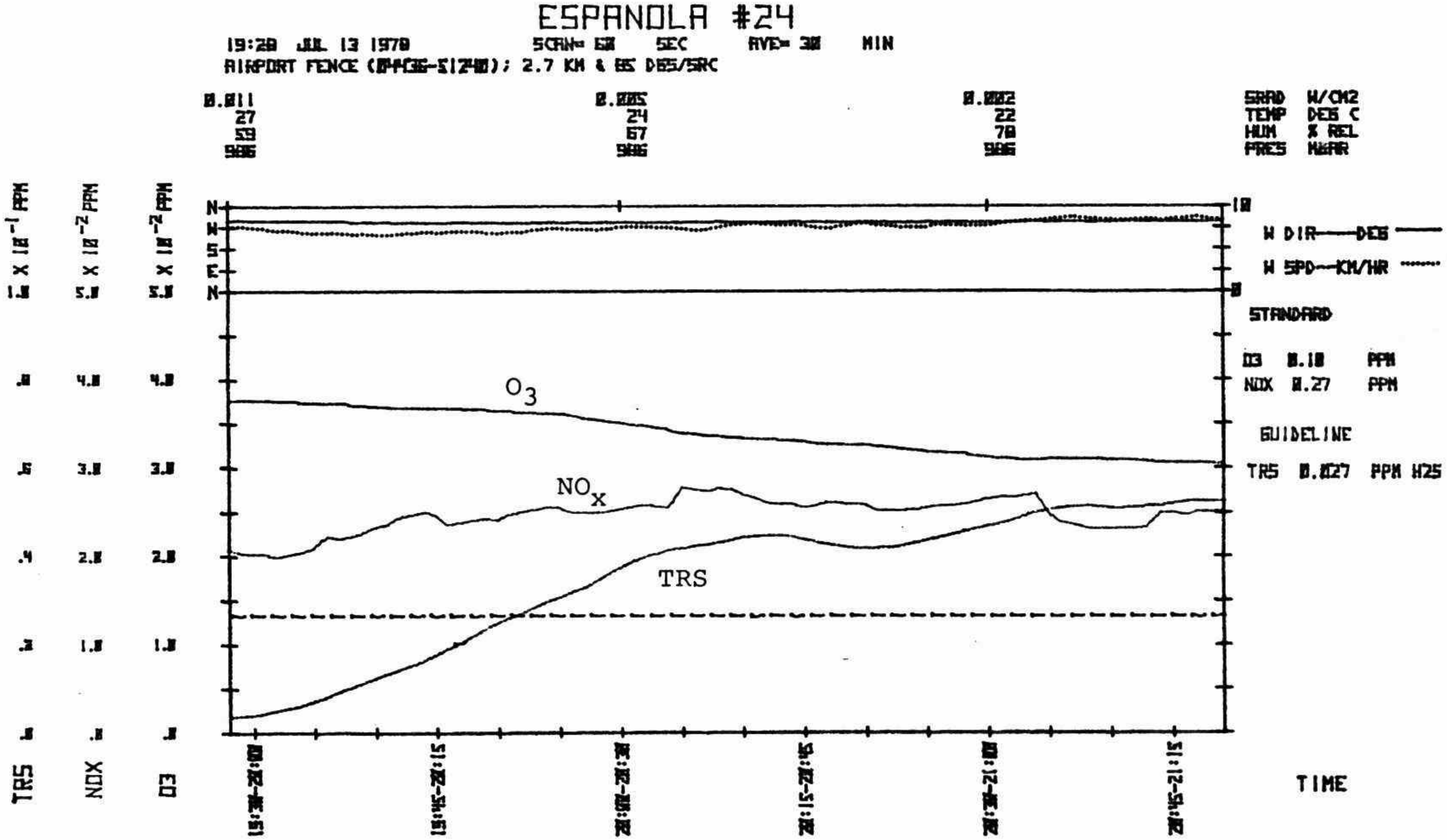

ESPANOLA #24
19:20 JUL 13 1978
SCAN= 60 SEC
AVE= 30 MIN
AIRPORT FENCE (0446-51240); 2.7 KM & 85 DEG/SRC
0.011
27
59
986
0.005
24
67
986
0.002
22
70
986
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
N
W
S
E
N
10
0
W DIR——DEG
W SPD---KM/HR
STANDARD
O3 0.10 PPM
NOX 0.27 PPM
GUIDELINE
TRS 0.027 PPM H2S
O3
NOx
TRS
TRS
1.0 X 10⁻¹ PPM
NOX
5.0 X 10⁻² PPM
O3
5.0 X 10⁻² PPM
.8 4.0 4.0
.6 3.0 3.0
.4 2.0 2.0
.2 1.0 1.0
.0 .0 .0
19:30-20:00
19:45-20:15
20:00-20:30
20:15-20:45
20:30-21:00
20:45-21:15
TIME

Figure 4

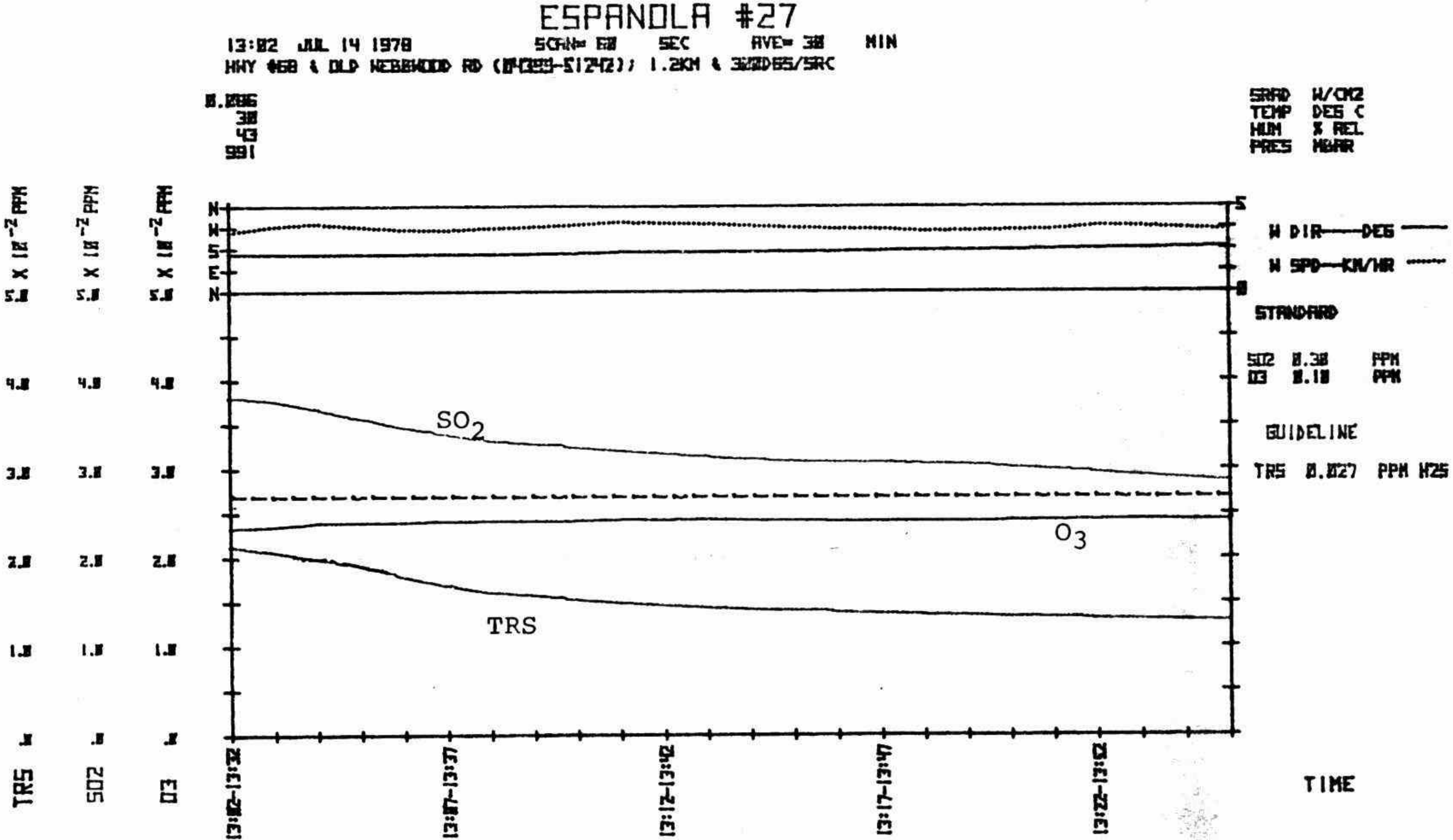

ESPANOLA #27
13:02 JUL 14 1978 SCAN= 60 SEC AVE= 30 MIN
HWY #68 & OLD WEBBWOOD RD (N4399-E1242); 1.2KM & 300DEG/SRC
0.006
30
43
991
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
N
W
S
E
N
5
0
W DIR——DEG
W SPD——KM/HR
STANDARD
SO2 0.30 PPM
O3 0.10 PPM
GUIDELINE
TRS 0.027 PPM H2S
5.0 X 10^-2 PPM
5.0 X 10^-2 PPM
5.0 X 10^-2 PPM
4.0
3.0
2.0
1.0
.0
TRS
SO2
O3
SO2
O3
TRS
13:02-13:32
13:07-13:37
13:12-13:42
13:17-13:47
13:22-13:52
TIME

Figure 5

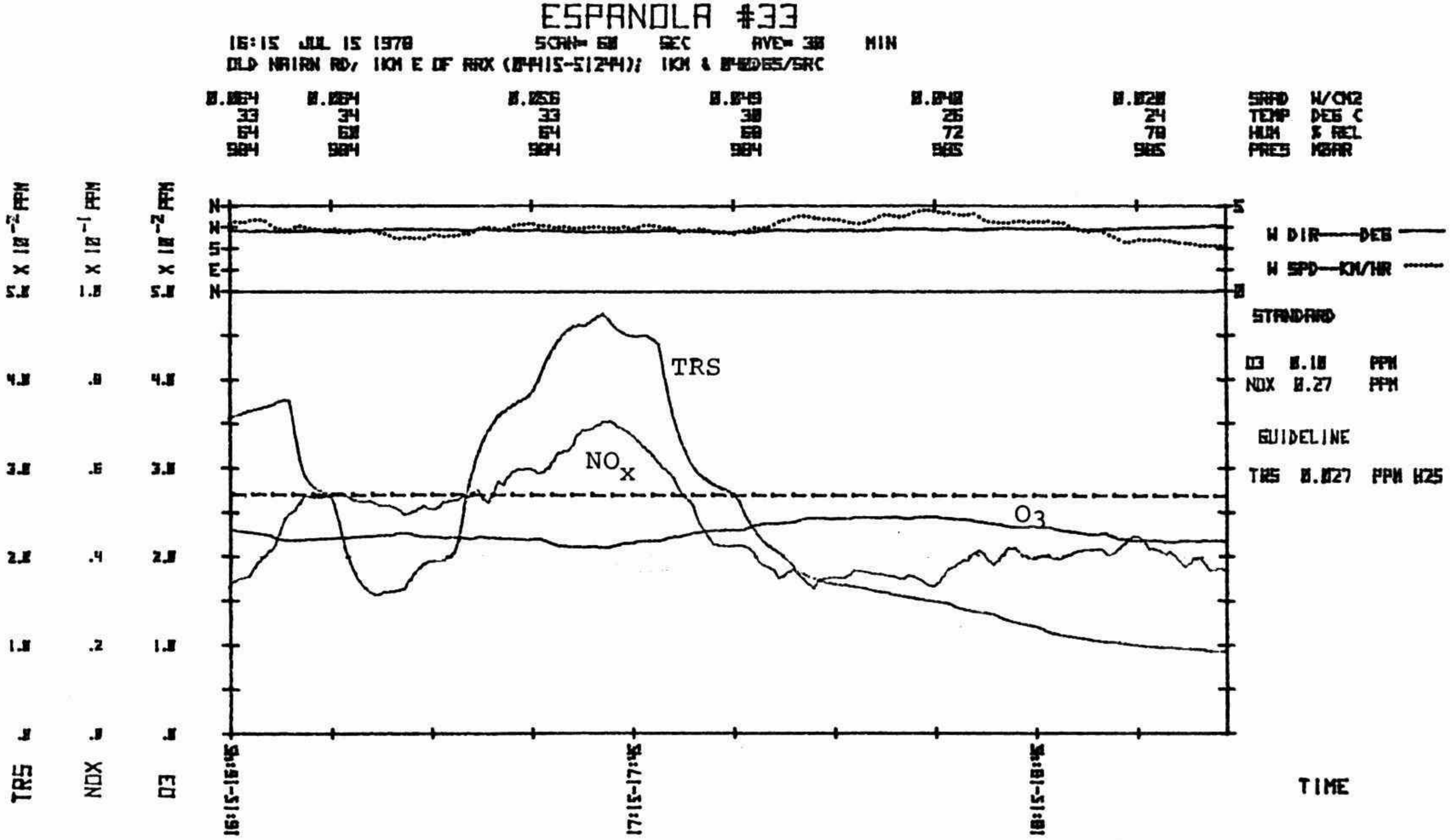

ESPANOLA #33
16:15 JUL 15 1970 SCAN= 60 SEC AVE= 30 MIN
OLD NAIRN RD/ 1KM E OF ARX (04415-51244); 1KM & 040DEG/SRC
0.064 0.064 0.056 0.049 0.040 0.020 SRAD W/CM2
33 34 33 30 26 24 TEMP DEG C
64 60 64 60 72 70 HUM % REL
984 984 984 984 985 985 PRES MBAR
N
N
S
E
N
S
0
W DIR——DEG
W SPD——KM/HR
STANDARD
O3 0.10 PPM
NOX 0.27 PPM
GUIDELINE
TRS 0.027 PPM H25
5 X 10^-2 PPM
1 X 10^-1 PPM
5 X 10^-2 PPM
5.0 1.0 5.0
4.0 .8 4.0
3.0 .6 3.0
2.0 .4 2.0
1.0 .2 1.0
.0 .0 .0
TRS NOX O3
TRS
NOx
O3
16:15-16:45
17:15-17:45
18:15-18:45
TIME

Figure 6

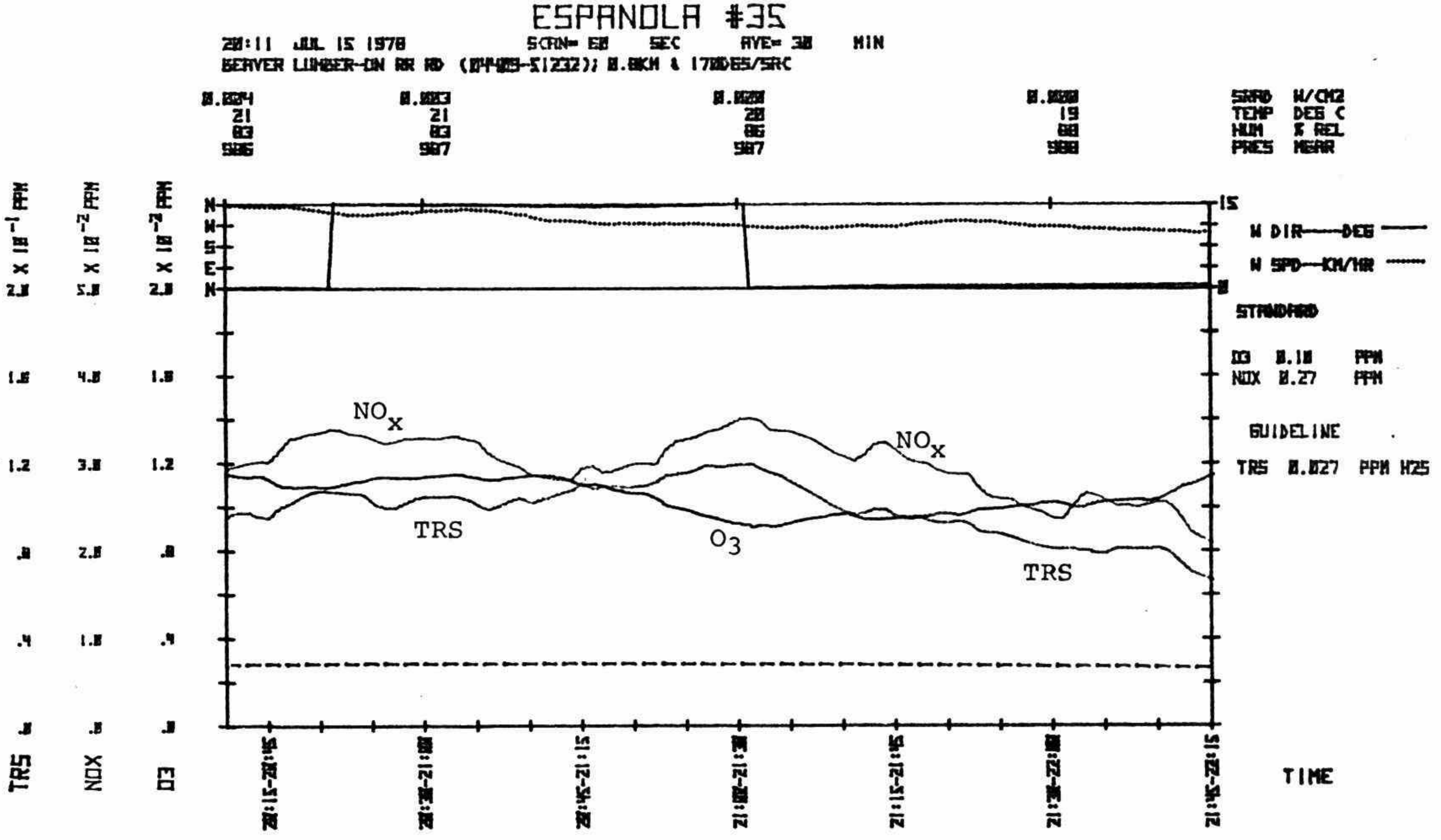

ESPANOLA #35
20:11 JUL 15 1978
SCAN= 60 SEC
AVE= 30 MIN
BEAVER LUMBER-ON RR RD (04405-51232); 0.0KM & 170DEG/SRC
0.004
21
83
986
0.003
21
83
987
0.000
20
86
987
0.000
19
88
988
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
TRS x 10^{-1} PPM
NOX x 10^{-2} PPM
O3 x 10^{-2} PPM
N
W
S
E
N
15
0
W DIR——DEG
W SPD——KM/HR
STANDARD
O3 0.10 PPM
NOX 0.27 PPM
GUIDELINE
TRS 0.027 PPM H2S
2.0
5.0
2.0
1.6
4.0
1.6
1.2
3.0
1.2
.8
2.0
.8
.4
1.0
.4
.0
.0
.0
TRS
NOX
O3
NO_x
NO_x
TRS
O_3
TRS
20:15-20:45
20:30-21:00
20:45-21:15
21:00-21:30
21:15-21:45
21:30-22:00
21:45-22:15
TIME

Figure 7

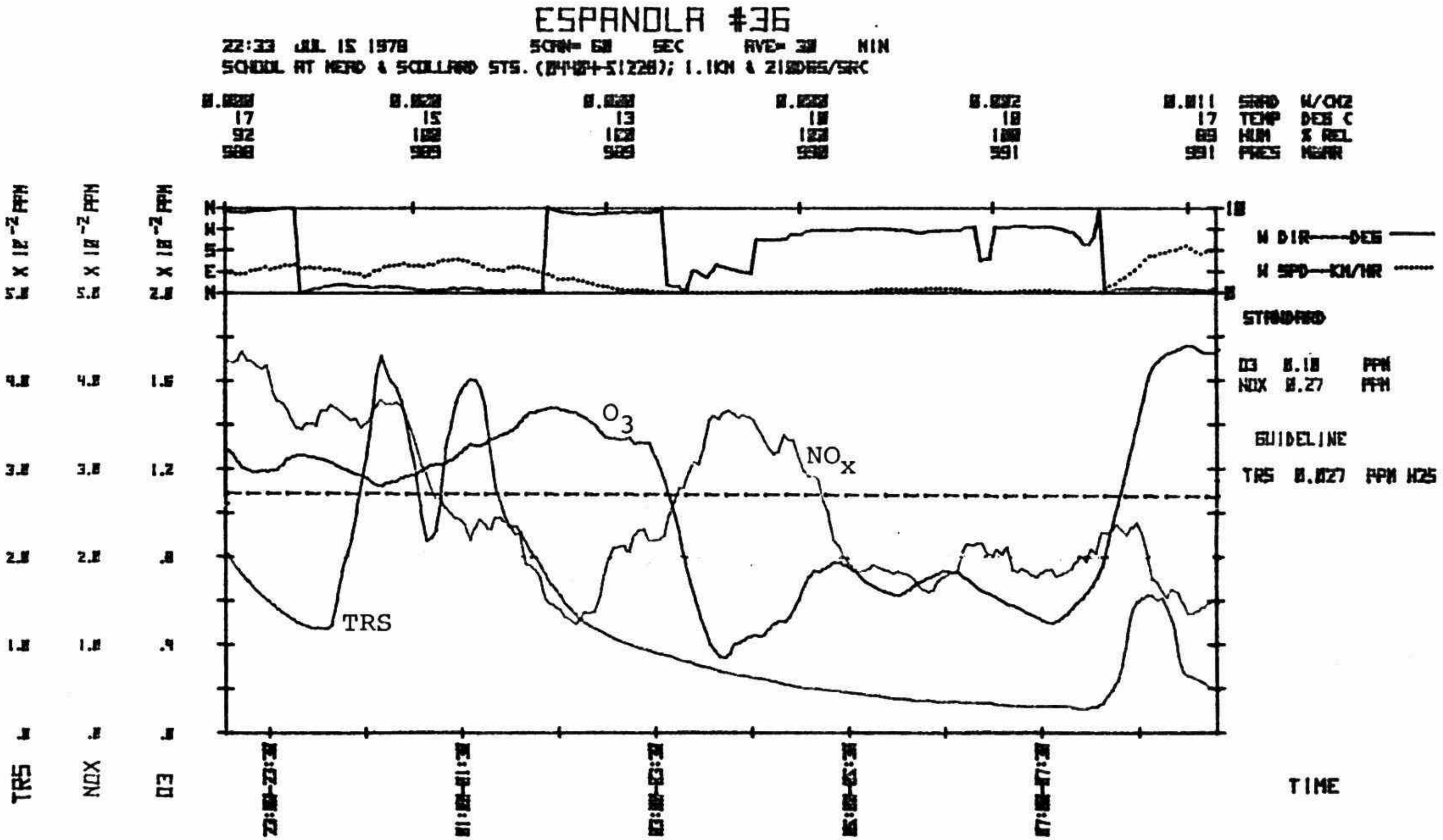

ESPANOLA #36
22:33 JUL 15 1978 SCAN= 60 SEC AVE= 30 MIN
SCHOOL AT HEAD & SCOLLARD STS. (04404-51220); 1.1KM & 210DEG/SEC
0.000 17 92 988
0.000 15 100 989
0.000 13 100 989
0.000 10 100 990
0.002 10 100 991
0.011 17 89 991
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
N
W
S
E
N
10
0
W DIR----DEG
W SPD---KM/HR
STANDARD
O3 0.10 PPM
NOX 0.27 PPM
GUIDELINE
TRS 0.027 PPM H2S
5.0 X 10^{-2} PPM
5.0 X 10^{-2} PPM
2.0 X 10^{-2} PPM
4.0
4.0
1.6
3.0
3.0
1.2
2.0
2.0
.8
1.0
1.0
.4
.0
.0
.0
TRS
NOX
O3
O$_3$
NO$_x$
TRS
23:00-23:30
01:00-01:30
03:00-03:30
05:00-05:30
07:00-07:30
TIME

Figure 8

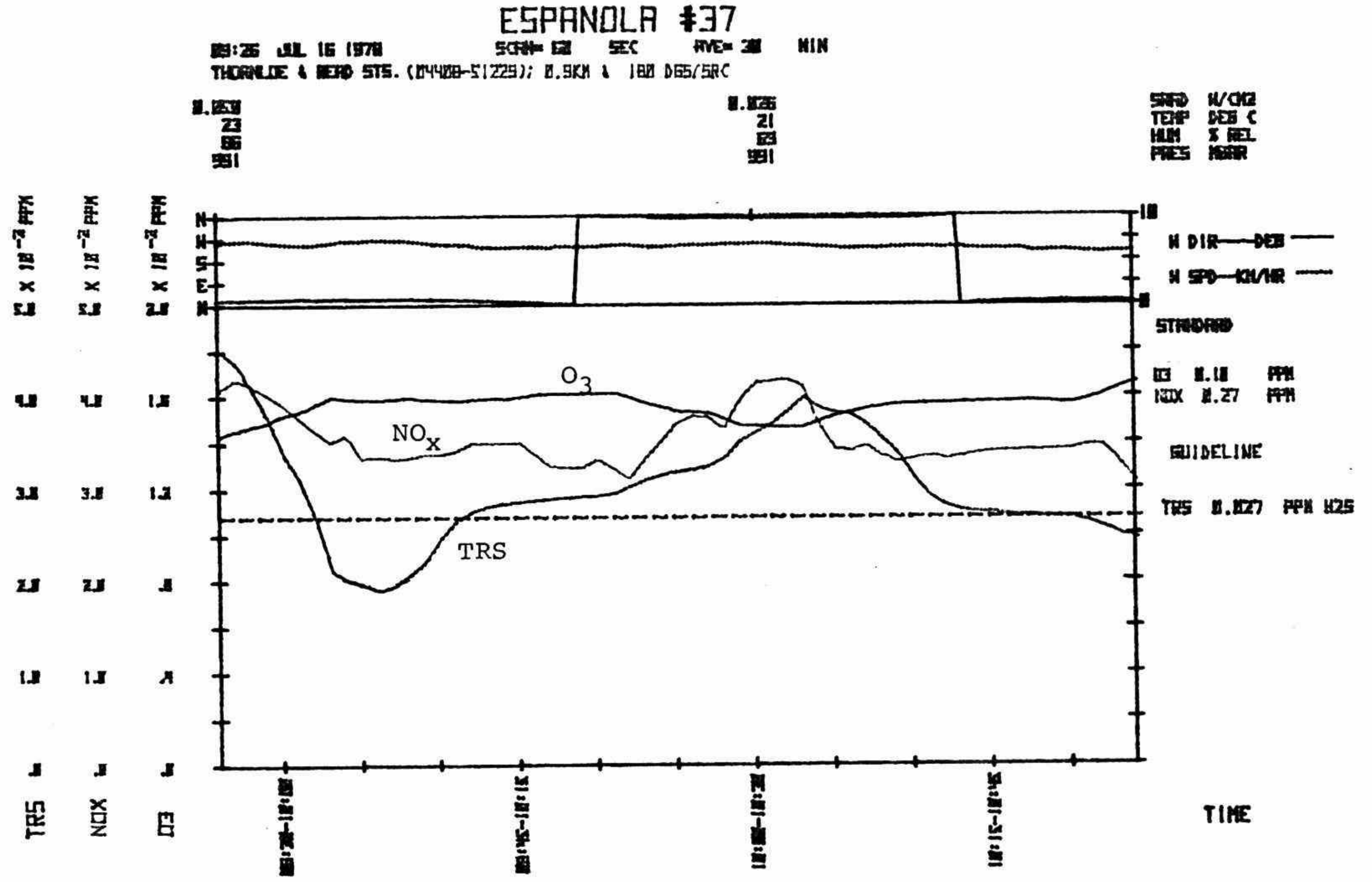

ESPANOLA #37
09:26 JUL 16 1978
SCAN= 60 SEC
AVE= 30 MIN
THORNLOE & BEAD STS. (04408-51229); 0.9KM & 180 DEG/SRC
0.059
23
86
991
0.026
21
83
991
SRAD W/CM2
TEMP DEG C
HUM % REL
PRES MBAR
N
W
S
E
N
10
0
W DIR——DEG
W SPD——KM/HR
STANDARD
O3 0.10 PPM
NOX 0.27 PPM
GUIDELINE
TRS 0.027 PPM H2S
O3
NOx
TRS
X 10^-2 PPM
5.0
4.0
3.0
2.0
1.0
.0
X 10^-2 PPM
5.0
4.0
3.0
2.0
1.0
.0
X 10^-2 PPM
2.0
1.6
1.2
.8
.4
.0
TRS
NOX
O3
09:30-10:00
09:45-10:15
10:00-10:30
10:15-10:45
TIME

Figure 9

ESPANOLA #6

16:52 JUL 6 1978 SCAN= 60 SEC AVE= 30 MIN
LENGTH= 2.4 HRS MINIMUM MEAN= 1.00000E-03 PPM
DELAY= 0 MIN WIND RANGE= 3 / 25 KM/HR
LOC: OLD NAIRN RD & RRX (04408-51246); 0.9KM & 350DGS/SRC

ARITHMETIC MEAN: TRS
1 DIV= 0.01 PPM
PREVAILING WINDS; BLOWING TOWARDS
1 DIV= 10 %

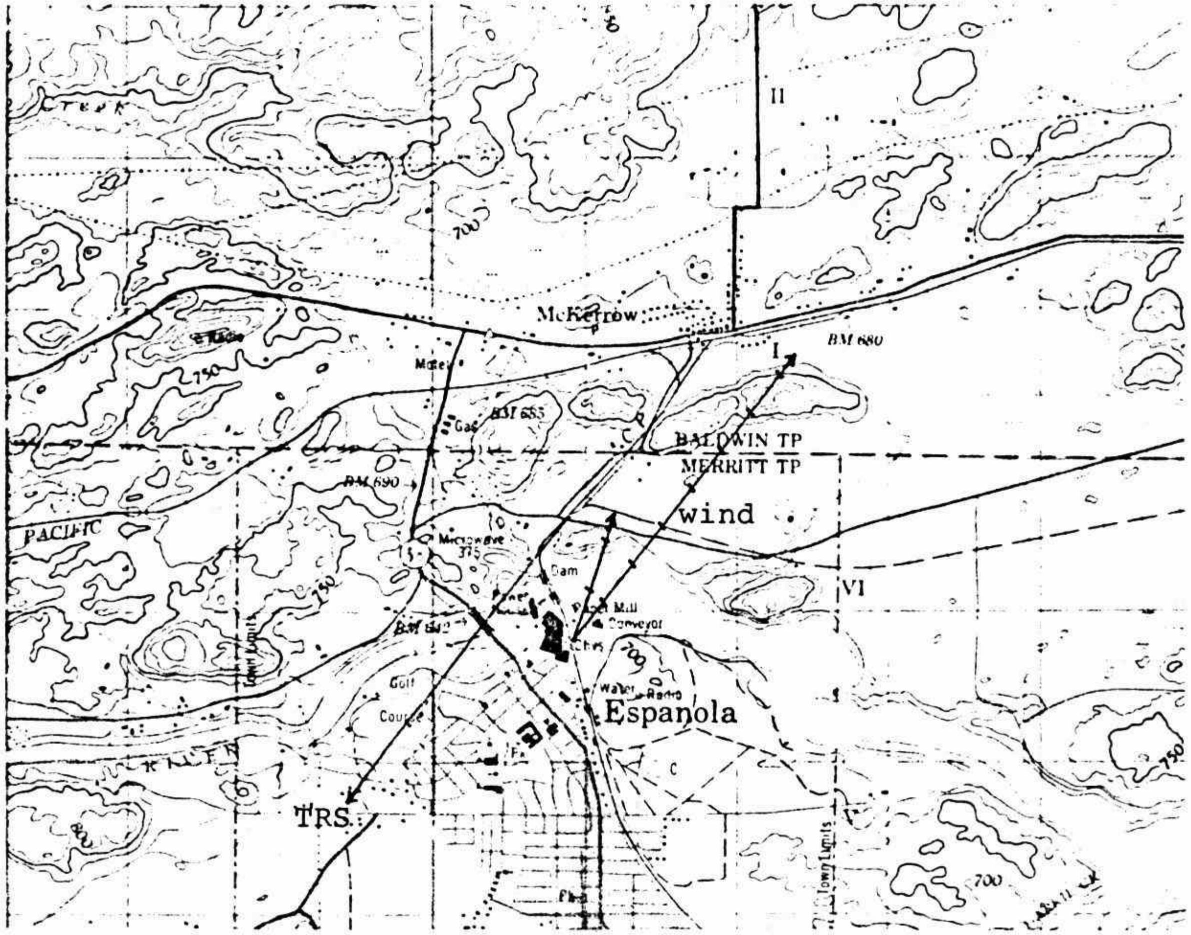


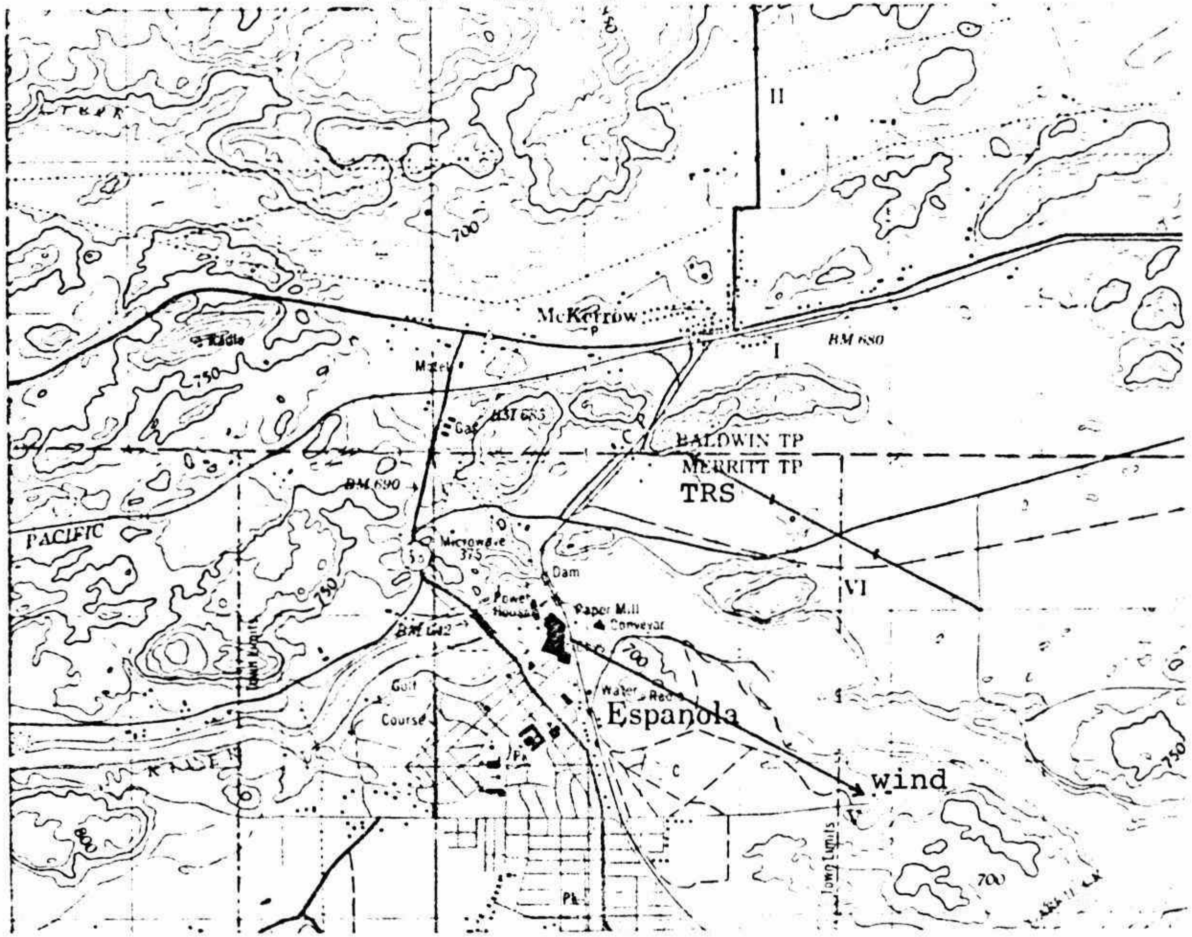
Figure 10

ESPANOLA #24

```
19:28  JUL 13 1978             SCAN= 60   SEC     AVE= 30   MIN
LENGTH= 1.8   HRS              MINIMUM MEAN= 1.00000E-03   PPM
DELAY=  0     MIN              WIND RANGE= 5    , 10    KM/HR
LOC: AIRPORT FENCE (04436-51240); 2.7 KM & 85 DGS/SRC

                    ARITHMETIC MEAN: TRS
                    1 DIV= 0.01      PPM

                    PREVAILING WINDS; BLOWING TOWARDS
                    1 DIV= 100   %
```



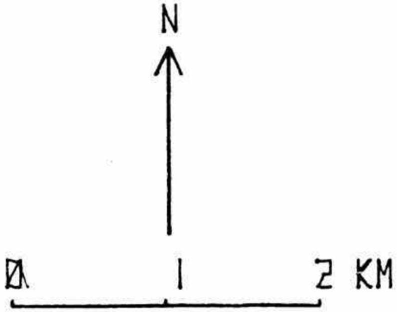
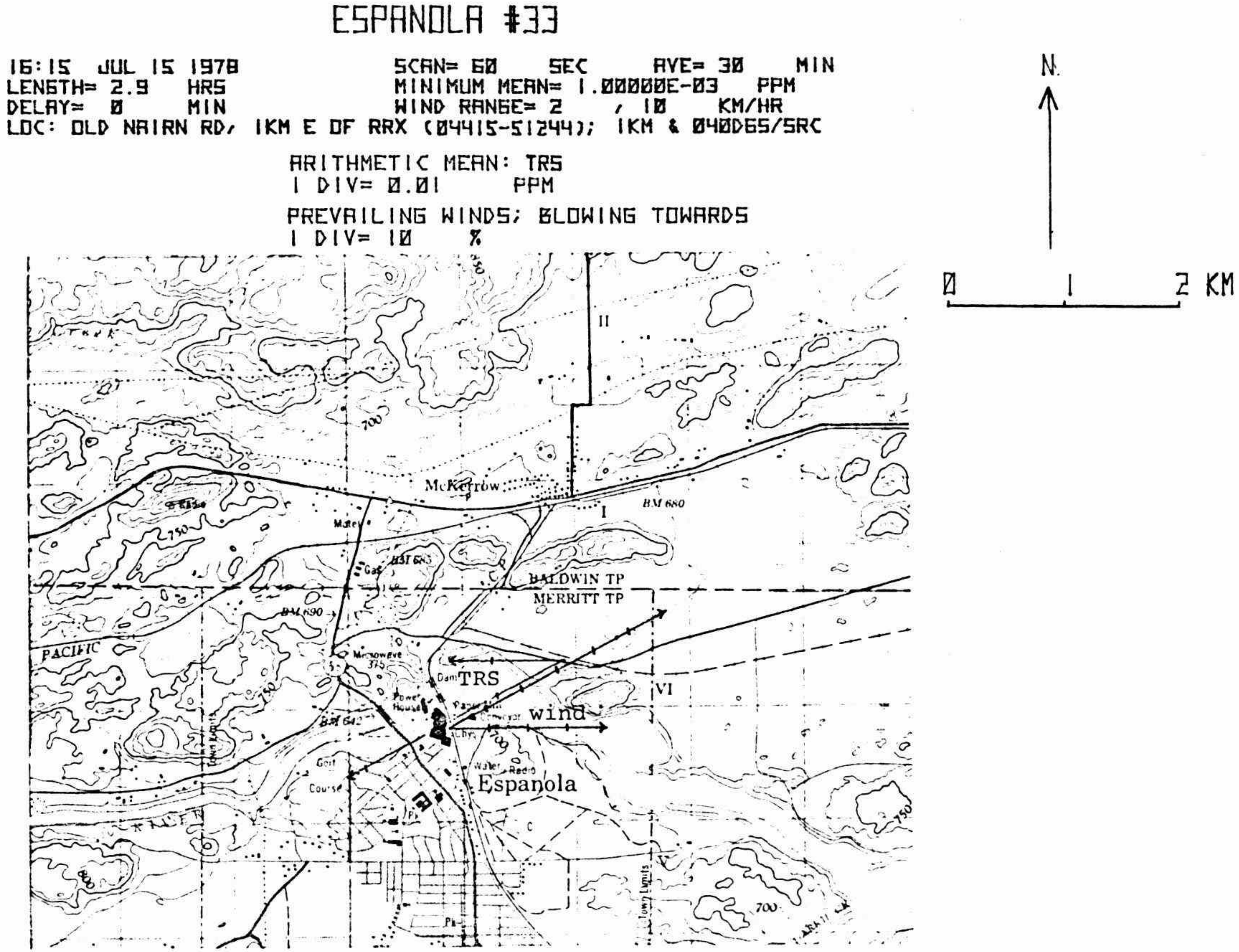


Figure 11



ESPANOLA #33

16:15 JUL 15 1978 SCAN= 60 SEC AVE= 30 MIN
LENGTH= 2.9 HRS MINIMUM MEAN= 1.00000E-03 PPM
DELAY= 0 MIN WIND RANGE= 2 , 10 KM/HR
LOC: OLD NAIRN RD, 1KM E OF RRX (04415-51244); 1KM & 040DEG/SRC

ARITHMETIC MEAN: TRS
1 DIV= 0.01 PPM

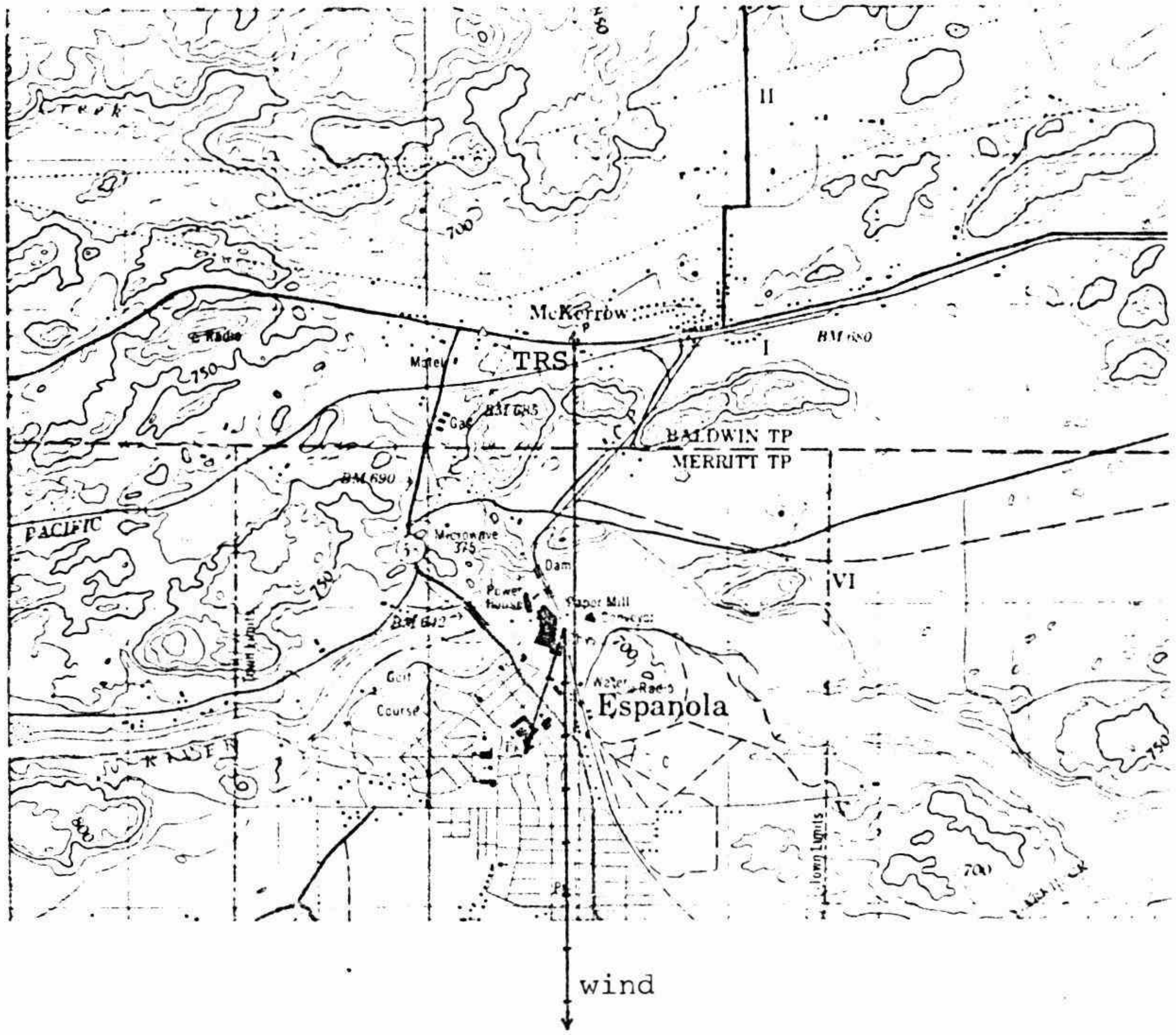
PREVAILING WINDS; BLOWING TOWARDS
1 DIV= 10 %

Figure 12

ESPANOLA #35

20:11 JUL 15 1978 SCAN= 60 SEC AVE= 30 MIN
LENGTH= 2 HRS MINIMUM MEAN= 1.00000E-03 PPM
DELAY= 0 MIN WIND RANGE= 5 , 20 KM/HR
LOC: BEAVER LUMBER-ON RR RD (04409-51232); 0.8KM & 170DGS/SRC

ARITHMETIC MEAN: TRS
1 DIV= 0.1 PPM
PREVAILING WINDS; BLOWING TOWARDS
1 DIV= 10 %



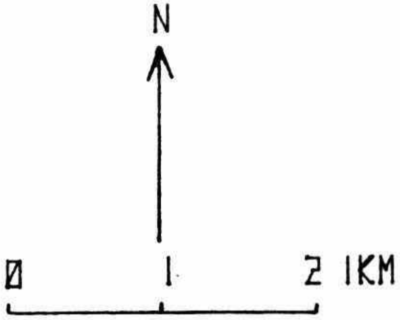


Figure 13

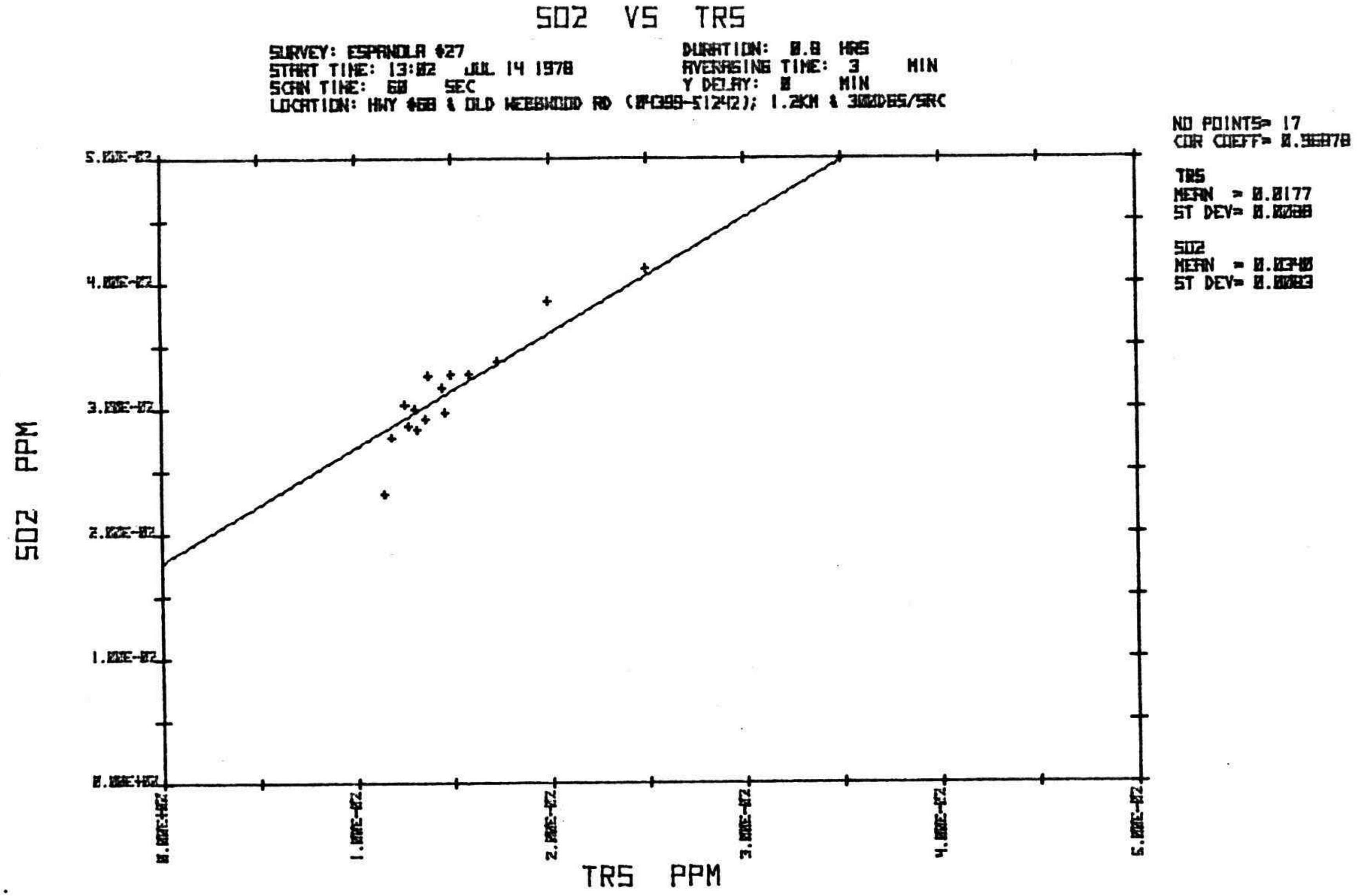

SO2 VS TRS
SURVEY: ESPANOLA #27
START TIME: 13:02 JUL 14 1978
SCAN TIME: 60 SEC
LOCATION: HWY #68 & OLD WEBBWOOD RD (0-0399-51242); 1.2KM & 300DEG/SRC
DURATION: 0.8 HRS
AVERAGING TIME: 3 MIN
Y DELAY: 0 MIN
NO POINTS= 17
COR COEFF= 0.96878
TRS
MEAN = 0.0177
ST DEV= 0.0088
SO2
MEAN = 0.0340
ST DEV= 0.0083
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
SO2 PPM
0.00E+00
1.00E-02
2.00E-02
3.00E-02
4.00E-02
5.00E-02
TRS PPM

Figure 14

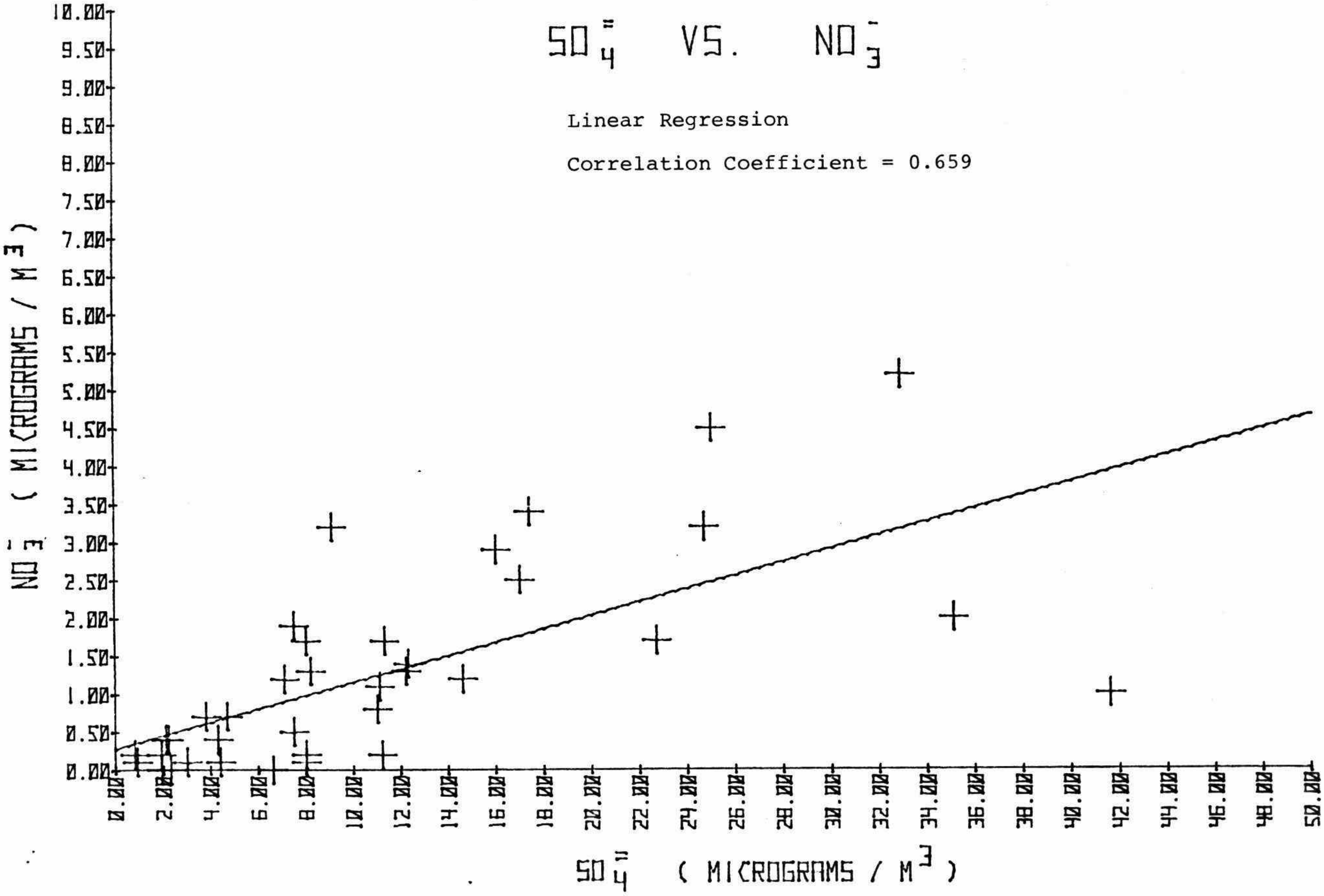

$SO_4^=$ VS. NO_3^-
Linear Regression
Correlation Coefficient = 0.659
NO_3^- (MICROGRAMS / M^3)
10.00
9.50
9.00
8.50
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
42.00
44.00
46.00
48.00
50.00
$SO_4^=$ (MICROGRAMS / M^3)

Figure 15

TABLE 4a HI-VOL ANALYSES FOR ESPANOLA, 1978

SITE	HI-VOL	SITE LOCATION	DATE	MICROGRAMS/m^3						Sample Time (Hrs.)	WIND	COMMENTS
I.D.	NUMBER		JULY	T.S.P.	Total Carbon	$SO_4^=$	NO_3^-	Na	Ca		DIR. & SPEED	& REMARKS
2	20076	OLD McKERROW RD (OMR)	4	46	7.9	11.3	1.7			23.5	-	
4	20099	SECOND AVE (S)	4	21	5.6	4.7	0.7			22		
2	DEL-E1	OMR	4	-				1.008	0.657	23.5		
		Daily Average	4	34	6.7	8.0	1.2					
1	20077	McKERROW (M)	6	91	8.4	17.4	3.4			24	SW	
2	20098	OMR	6	95	10.0	25.0	4.5			24	10	
3	20097	Post Office (P.O.)	6	97	10.7	32.9	5.2			24		
4	20094	S	6	48	7.6	17.0	2.5			24		
2	DEL-E2	OMR	6	-				2.712	3.064	24		
3	DEL-E3	P.O.	6	-				0.405	1.832	24		
		Daily Average	6	83	9.2	23.1	3.9					
1	20078	M	7	89	7.9	24.7	3.2			24	calm	Temp. reaches 35°C
2	20079	OMR	7	153	8.8	35.1	2.0			24		
3	20080	P.O.	7	122	11.6	41.6	1.0			24		
4	20093	S	7	52	7.0	22.7	1.7			24		
2	DEL-E4	OMR	7	-				0.637	2.531	24		

TABLE 4b HI-VOL ANALYSES FOR ESPANOLA, 1978

SITE I.D.	HI-VOL NUMBER	SITE LOCATION	DATE JULY	T.S.P.	Total Carbon	$SO_4^=$	NO_3^-	Na	Ca	Sample Time (Hrs.)	WIND DIR. & SPEED	COMMENTS & REMARKS
				MICROGRAMS/m^3								
3	DEL-E5	P.O.	7	-				0.498	2.001	24		
		Daily Average	7	104	8.8	31.0	2.0					
1	20081	M	8	8	5.6	2.3	0			24	N	
2	20082	QMR	8	28	6.8	4.3	0.4			24	10	
3	20083	P.O.	8	40	7.4	11.1	1.1			24		
4	20084	S	8	13	5.0	3.0	0.1			23.3		
2	DEL-E6	QMR	8	-				0.128	0.137	24		
3	DEL-E7	P.O.	8	-				2.356	1.610	24		
		Daily Average	8	22	6.2	5.2	0.4					
1	20095	M	9	20	5.8	4.4	0.1			24	SW	
2	20085	QMR	9	30	5.6	11.0	0.8			23.8	5	
3	20086	P.O.	9	20	-	7.5	0.5			23.5		
	20087	S	9	14	4.3	6.6	0			23.8		
	DEL-E8	QMR	9	-				1.005	0.416	23.8		
	DEL-E9	P.O.	9	-				0.197	0.402	23.5		
		Daily Average	9	21	5.2	7.4	0.4					

TABLE 4c HI-VOL ANALYSES FOR ESPANOLA, 1978

SITE I.D.	HI-VOL NUMBER	SITE LOCATION	DATE JULY	MICROGRAMS/m^3 T.S.P.	Total Carbon	$SO_4^=$	NO_3^-	Na	Ca	Sample Time (Hrs.)	WIND DIR. & SPEED	COMMENTS & REMARKS
1	20092	M	10	18	4.3	0.9	0.1			23.8	WNW	
2	20091	OMR	10	28	8.9	0.8	0.2			23.8	10	
3	20090	P.O.	10	29	4.6	2.2	0.4			23.7		
4	20089	S	10	24	4.7	6.6	0			23.7		
2	DEL-E10	OMR	10	-				0.095	0.199	23.8		
3	DEL-E11	P.O.	10	-				0.263	0.574	23.7		
		Daily Average	10	25	5.6	2.6	0.2					
1	600151	M	11	44	5.6	1.9	0			24.7	WSW	
2	600152	OMR	11	41	5.8	1.9	0.2			24.8	8	
3	600153	P.O.	11	48	5.4	3.8	0.7			24		
4	600154	S	11	29	5.3	2.1	0.4			25		
2	DEL-E12	OMR	11	-				0.133	2.497	24.8		
3	DEL-E13	P.O.	11	-				0.388	1.015	24		
		Daily Average		40	5.5	2.4	0.3					
1	600155	M	12	74	5.8	8.0	1.7			23.8	S	
2	600156	OMR	12	78	8.0	16.0	2.9			23.7	15	

TABLE 4 d HI-VOL ANALYSES FOR ESPANOLA, 1978

SITE I.D.	HI-VOL NUMBER	SITE LOCATION	DATE JULY	MICROGRAMS/m^3 T.S.P.	Total Carbon	$SO_4^=$	NO_3^-	Na	Ca	Sample Time (Hrs.)	WIND DIR. & SPEED	COMMENTS & REMARKS
3	600157	P.O.	12	63	6.2	8.2	1.3			23.7		
4	600158	S	12	32	4.9	12.2	1.3			23.8		
2	DEL-E14	OMR	12	-				0.348	2.323	23.7		
3	DEL-E15	P.O.	12	-				0.504	2.095	23.7		
		Daily Average	12	62	6.2	11.1	1.8					
1	600159	M	13	25	4.3	9.1	3.2			25.2	W	
2	600160	OMR	13	30	6.0	7.5	1.9			24.8	8	
3	600161	P.O.	13	40	6.8	12.3	1.4			23.8		
4	600162	S	13	18	4.8	7.1	1.2			23		
2	DEL-E16	OMR	13	-				0.415	0.299	24.8		
3	DEL-E17	P.O.	13	-				0.369	2.212	23.8		
		Daily Average	13	28	5.5	9.0	1.9					
1	600166	M	14	25	3.4	8.0	0.2			24	E, SE	
2	600165	OMR	14	28	4.9	11.2	0.2			24.2	4	
3	600164	P.O.	14	49	5.5	14.6	1.2			24		
[illegible]	600163	S	14	18	3.4	8.0	0.1			24.5		

TABLE 4 e HI-VOL ANALYSES FOR ESPANOLA, 1978

SITE I.D.	HI-VOL NUMBER	SITE LOCATION	DATE JULY	MICROGRAMS/m^3						Sample Time (Hrs.)	WIND DIR. & SPEED	COMMENTS & REMARKS
				T.S.P.	Total Carbon	$SO_4^=$	NO_3^-	Na	Ca			
2	DEL-E19	OMR	14	-				0.401	0.520	24.2		
3	DEL-E18	P.O.	14	-				0.368	0.160	24		
		Daily Average	14	30	43	10.4	0.4					

TABLE 4f

Hi-Volume Results: T.S.P. (ug/m^3)

Date	Site #1	Site #2	Site #3	Site #4	Comments
July 4th	-	46	-	21	
" 6th	91	95	97	48	light SW wind
" 7th	89	153	122	52	hot, humid, calm
" 8th	8	28	40	13	steady N, NE wind, plume aloft
" 9th	20	30	20	14	
" 10th	18	28	29	24	
" 11th	44	41	48	29	
" 12th	74	78	63	32	15 km/hr wind from S, SE
" 13th	25	30	40	18	
" 14th	25	28	49	18	
Average:	44	56	56	27	

TABLE 4g

Hi-Volume Results: Carbon (ug/m^3)

DATE	SITE #1			SITE #2			SITE #3			SITE #4			Wind
	Total C	Free C	Bound C	Total C	Free C	Bound C	Total C	Free C	Bound C	Total C	Free C	Bound C	
July 4	-	-	-	7.89	3.83	4.06	-	-	-	5.61	2.88	2.73	-
" 6	8.39	3.56	4.83	10.02	3.67	6.35	10.70	5.53	5.17	7.61	3.82	3.79	SW 10
" 7	7.93	4.28	3.65	8.79	4.58	4.21	11.60	4.61	6.99	7.00	2.33	4.67	Calm
" 8	5.65	4.27	1.38	6.80	2.62	4.18	7.36	2.94	4.42	5.00	2.68	2.32	N 10
" 9	5.77	2.90	2.87	5.60	3.28	2.32	-	-	-	4.30	2.01	2.29	SW 5
" 10	4.32	2.90	1.42	8.86	2.87	5.99	4.60	2.99	1.61	4.72	2.94	1.78	WNW 10
" 11	5.63	2.60	3.03	5.76	2.84	2.92	5.40	2.02	3.38	5.30	2.39	2.91	WSW 8
" 12	5.79	3.73	2.06	7.98	3.57	4.41	6.20	2.42	3.78	4.93	2.54	2.39	S 15
" 13	4.33	2.31	2.02	6.01	2.45	3.56	6.80	2.14	4.66	4.83	3.25	1.58	W 8
" 14	3.37	1.62	1.75	4.92	2.05	2.87	5.50	1.88	3.62	3.37	1.19	2.18	E, SE 4
Average	5.69	3.13	2.56	7.26	3.18	4.08	7.27	3.06	4.21	5.27	2.60	2.67	

TABLE 4h

Hi-Volume Results: Na, Ca (ug/m^3)

DATE	SITE # 2		SITE # 3		PREVAILING WIND
July'78	Na	Ca	Na	Ca	DIRECTION, SPEED
4	1.008	0.657	-	-	-
6	2.712	3.064	0.405	1.832	SW10
7	0.637	2.531	0.498	2.001	Calm
8	0.128	0.137	2.356	1.610	N10
9	1.005	0.416	0.197	0.402	SW5
10	0.095	0.199	0.263	0.574	WNW10
11	0.133	2.497	0.388	1.015	WSW 8
12	0.348	2.323	0.504	2.095	S15
13	0.415	0.299	0.369	2.212	W 8
14	0.401	0.520	0.368	0.160	E,SE 4
AVERAGE	0.688	1.264	0.594	1.322	

TABLE 4i

Hi-Volume Results : $SO_4^=$, NO_3^- (ug/m^3)

Date	Site # 1		Site # 2		Site # 3		Site # 4		PREVAILING WIND DIRECTION, SPEED
	$SO_4^=$	NO_3^-	$SO_4^=$	NO_3^-	$SO_4^=$	NO_3^-	$SO_4^=$	NO_3^-	
July 4			11.3	1.7			4.7	0.7	
" 6	17.4	3.4	25.0	4.5	32.9	5.2	17.0	2.5	SW 10
" 7	24.7	3.2	35.1	2.0	41.6	1.0	22.7	1.7	Calm
" 8	2.3	0	4.3	0.4	11.1	1.1	3.0	0.1	N 10
" 9	4.4	0.1	11.0	0.8	7.5	0.5	6.6	0	SW 5
" 10	0.9	0.1	0.8	0.2	2.2	0.4			WNW 10
" 11	1.9	0	1.9	0.2	3.8	0.7	2.1	0.4	WSW 8
" 12	8.0	1.7	16.0	2.9	8.2	1.3	12.2	1.3	S 15
" 13	9.1	3.2	7.5	1.9	12.3	1.4	7.1	1.2	W 8
" 14	8.0	0.2	11.2	0.2	14.6	1.2	8.0	0.1	ESE 4
Average	8.5	1.3	12.4	1.5	14.9	1.4	9.0	0.8	

TABLE 5a Contaminant Levels in Espanola 1978

Units - ppm

LOCATION	Date July 1978	Monitored Period	Instantaneous Concentration				Maximum 1/2 Hour Average Concentration		Sample Period Mean Concentration		Scan Time
			SO_2		TRS						
			Min.	Max.	Min.	Max.	SO_2	TRS	SO_2	TRS	(min.)
Espanola #3	5	22:58-09:50	0.001	0.011	0.001	0.037	0.007	0.021	0.003	0.001	1
" #5	6	13:53-16:08	0.001	0.014	0.005	0.030	0.009	0.025	0.004	0.018	1
" #6	6	16:52-19:07	0.003	0.037	0.001	0.035	0.027	0.024	0.018	0.011	1
" #7	6	19:36-09:06	0.004	0.015	0.001	0.005	0.013	0.002	0.009	0.001	2.5
" #9	7	13:57-14:57	0.001	0.005	0.012	0.044	0.003	0.034	0.002	0.024	1
" #19	11	18:13-19:03	0.003	0.004	-	-	0.004	-	0.004	-	2.5
" #21	12	12:23-15:08	0.006	0.011	-	-	0.003	-	0.001	-	1
" #24	13	19:28-21:23	-	-	0.001	0.079	-	0.051	-	0.032	1
" #26	14	11:21-12:21	0.012	0.033	0.014	0.051	0.028	0.022	0.023	0.021	1
" #27	14	13:02-13:54	0.023	0.061	0.011	0.048	0.038	0.021	0.037	0.018	1
" #28	14	14:44-16:29	0.001	0.098	0.008	0.058	0.087	0.020	0.041	0.014	1
" #29	14	16:59-18:44	0.001	0.002	0.001	0.006	0.001	0.002	0.001	0.002	1
" #30	14	21:07-09:22	0.001	0.006	0.001	0.016	0.001	0.006	0.001	0.001	1
" #31	15	13:24-14:39			0.007	0.024		0.012		0.011	1
" #33	15	16:15-19:00			0.008	0.165		0.045		0.023	1
" #35	15	20:11-22:11			0.034	0.246		0.120		0.092	1

TABLE 5b Contaminant Levels in Espanola 1978 Page 59 Units - ppm

LOCATION	Date July 1978	Monitored Period	Instantaneous Concentration				Maximum 1/2 Hour Average Concentration		Sample Period Mean Concentration		Scan Time
			SO_2		TRS						
			Min.	Max.	Min.	Max.	SO_2	TRS	SO_2	TRS	(min.)
Espanola #36	15	22:33-09:03			0.002	0.093		0.040		0.013	1
" #37	16	09:26-10:41			0.011	0.186		0.045		0.034	1
#4	6	12:15-13:30			0.001	0.019		0.014		0.010	1

TABLE 6 Contaminant Levels in Espanola 1978 Units - ppm

LOCATION	Date July 1978	Monitored Period	Instantaneous Concentration				Maximum 1/2 Hour Average Concentration		Sample Period Mean Concentration		Scan Time
			O_3		NO_x						
			Min.	Max.	Min.	Max.	O_3	NO_x	O_3	NO_x	(min.)
Espanola #4	6	12:15-13:30	0.057	0.094	0.014	0.359	0.088	0.048	0.086	0.042	1
" #6	6	16:52-19:07	0.060	0.108	0.019	0.270	0.096	0.100	0.092	0.070	1
" #12	8	16:43-18:13	0.008	0.033	0.036	0.514	0.025	0.110	0.024	0.093	1
" #18	11	15:14-17:14	0.024	0.035	0.008	0.172	0.033	0.026	0.032	0.017	1
" #19	11	18:13-19:03	0.035	0.036	0.006	0.008	0.035	0.007	0.035	0.007	2.5
" #21	12	12:23-15:08	0.037	0.045	0.001	0.054	0.043	0.032	0.041	0.024	1
" #22	12	17:03-18:33	0.038	0.052	0.012	0.077	0.051	0.027	0.050	0.023	1
" #24	13	19:23-21:13	0.025	0,039	0.010	0.101	0.038	0.026	0.034	0.024	1
" #26	14	11:21-12:21	0.014	0.024	0.013	0.137	0.020	0.046	0.020	0.040	1
" #27	14	13:02-13:54	0.012	0.027	0.019	0.375	0.024	0.076	0.024	0.062	1
" #28	14	14:44-16:29	0.014	0.027	0.014	0.193	0.024	0.059	0.023	0.050	1
" #33	15	16:15-19:00	0.013	0.027	0.013	0.194	0.024	0.068	0.023	0.044	1
" #35	15	20:11-22:11	0.004	0.016	0.009	0.099	0.011	0.033	0.011	0.028	1
" #36	15	22:33-0903	0.001	0.019	0.010	0.098	0.018	0.042	0.010	0.025	1
" #37	16	09:26-10:41	0.006	0.020	0.008	0.171	0.016	0.041	0.016	0.036	1

ADDENDUM TO

ARB-TDA Report No. 11 - 80

AMBIENT AIR SURVEY IN ESPANOLA

1978

COMPILATION OF TIME AVERAGED DATA

The ambient air concentrations of selected gaseous pollutants and ground-level meteorological parameters as monitored by the Mobile Air Monitoring Unit in the vicinity of the E.B. Eddy Forest Products Limited pulp and paper mill at Espanola during July, 1978 are presented in the following statistical printouts.

All statistical values are based on cumulative averages of continual instantaneous interrogations of the analytical instruments, and all concentrations are expressed in parts per million (ppm).

The meteorological parameters are expressed as follows:

solar radiation - watts/cm^2
temperature - degrees C
relative humidity - per cent (%)
barometric pressure - millibars (mb)
wind speed - km/hr
wind direction - degrees

The monitoring periods are presented in chronological order; however, several are omitted for the following reasons:

1) insufficient data - 45 minutes was deemed the minimum monitoring period in order to establish a "true" 30-minute average concentration of the gaseous pollutants of interest.

ii) instrument failure - mainly data acquisition and data handling - cassette tape damage. The results for H_2S and SO_2 were omitted for those monitoring periods when their instruments malfunctioned.

iii) calibration effects - several monitoring periods included the residual instrument response to recently performed calibration.

The results are frequently expressed in the form:

A.B E - YZ,

which has the value of A.B times 10 raised to the power (-YZ).

For example, the average concentration of H_2S for the first 30-minute period of Espanola #3 (next page) is 2.1 E-02, or 0.021 ppm.

```
                                   ESPANOLA #3

DATE:                JUL  5 1978
SCAN TIME:           60    SEC
AVERAGING TIME:      30    MIN
LOCATION:
AIRPORT RD, 0.2KM S. OF OLD NAIRN RD(04435-51240); 2.7KM & 040DGS/SRC

      TIME              H2S             SO2              NOX             NO2
                        NO             OZONE          SOLAR RAD          TEMP
                    BAROMETER       WIND SPEED     WIND DIRECTION

22:59----23:29        2.1E-02         1.6E-03          4.7E-02         3.4E-02
                      2.1E-02         7.4E-02          5.4E-06           19
                        992              1               190

23:14----23:44        1.0E-02         4.5E-04          8.1E-02         5.0E-02
                      4.2E-02         6.3E-02          5.2E-06           19
                        992              1               188

23:29----23:59        4.9E-03         4.7E-04          1.1E-01         6.1E-02
                      6.6E-02         5.0E-02          5.6E-06           18
                        992              0               162

23:44----00:14        1.5E-03         1.6E-04          1.1E-01         7.9E-02
                      5.6E-02         4.7E-02          5.1E-06           17
                        992              0               149

23:59----00:29        1.4E-04         1.6E-04          1.0E-01         5.8E-02
                      6.2E-02         4.6E-02          3.6E-06           17
                        992              0               136

00:14----00:44        1.0E-06         1.0E-04          1.1E-01         6.2E-02
                      6.3E-02         4.5E-02          9.5E-06           17
                        992              0               179

00:29----00:59        1.0E-06         6.9E-05          9.4E-02         7.7E-02
                      3.6E-02         5.3E-02          1.4E-05           17
                        992              1               184

00:44----01:14        3.0E-05         5.0E-05          5.6E-02         3.4E-02
                      3.0E-02         5.6E-02          8.1E-06           16
                        992              1               191

00:59----01:29        3.0E-05         1.8E-06          5.8E-02         3.5E-02
                      3.4E-02         5.2E-02          7.8E-06           16
                        992              0               209

01:14----01:44        1.0E-06         8.4E-04          1.2E-01         8.3E-02
                      6.0E-02         4.1E-02          1.6E-05           16
                        992              0               216

01:29----01:59        3.6E-05         1.7E-03          1.3E-01         8.2E-02
                      6.7E-02         2.7E-02          3.0E-05           16
                        992              0               205

01:44----02:14        3.6E-05         1.3E-03          8.2E-02         4.2E-02
                      4.6E-02         3.0E-02          2.6E-05           17
                        992              0               143
```

```
     TIME              H2S           SO2            NOX          NO2
                       NO            OZONE       SOLAR RAD       TEMP
                   BAROMETER      WIND SPEED   WIND DIRECTION

01:59----02:29      1.0E-06        1.2E-03        7.7E-02       4.2E-02
                    4.1E-02        3.0E-02        8.2E-06         16
                      992             0             141

02:14----02:44      1.0E-06        1.1E-03        7.8E-02       5.0E-02
                    3.8E-02        2.4E-02        2.3E-06         15
                      991             0              50

02:29----02:59      1.0E-06        2.8E-03        1.4E-01       8.2E-02
                    7.3E-02        1.9E-02        3.7E-06         15
                      991             0              52

02:44----03:14      1.0E-06        5.6E-03        2.0E-01       1.1E-01
                    9.8E-02        1.2E-02        6.2E-06         15
                      991             0               5

02:59----03:29      1.0E-06        6.8E-03        1.7E-01       7.9E-02
                    9.7E-02        1.1E-02        6.2E-06         15
                      991             0             337

03:14----03:44      1.0E-06        6.9E-03        1.5E-01       5.0E-02
                    9.7E-02        1.1E-02        1.7E-05         15
                      991             0             347

03:29----03:59      1.0E-06        6.8E-03        1.4E-01       4.8E-02
                    9.4E-02        1.2E-02        3.1E-05         15
                      991             0             335

03:44----04:14      1.0E-06        4.8E-03        9.5E-02       3.5E-02
                    6.9E-02        1.2E-02        2.8E-05         15
                      991             0             310

03:59----04:29      1.0E-06        1.9E-03        5.6E-02       2.8E-02
                    3.3E-02        1.2E-02        1.2E-05         15
                      991             0             312

04:14----04:44      1.0E-06        2.5E-03        8.9E-02       2.5E-02
                    7.2E-02        9.7E-03        3.5E-06         15
                      991             0             126

04:29----04:59      1.0E-06        4.1E-03        1.1E-01       2.4E-02
                    9.5E-02        7.0E-03        8.3E-06         15
                      991             0             188

04:44----05:14      1.0E-06        5.4E-03        1.3E-01       3.2E-02
                    9.9E-02        6.4E-03        1.0E-05         14
                      991             0             300

04:59----05:29      1.0E-06        4.9E-03        1.1E-01       3.6E-02
                    8.5E-02        6.5E-03        2.2E-05         14
                      991             0               5

05:14----05:44      1.0E-06        4.6E-03        1.1E-01       4.1E-02
                    7.5E-02        6.3E-03        1.0E-04         14
                      991             0               6
```

```
        TIME               H2S              SO2              NOX            NO2
                           NO              OZONE          SOLAR RAD         TEMP
                        BAROMETER       WIND SPEED     WIND DIRECTION

05:29----05:59           1.0E-06          5.7E-03          1.3E-01        3.8E-02
                         9.7E-02          5.9E-03          2.7E-04          15
                           991               0               300

05:44----06:14           1.0E-06          4.5E-03          9.6E-02        2.9E-02
                         7.5E-02          6.0E-03          6.1E-04          15
                           991               0               345

05:59----06:29           1.0E-06          2.1E-03          5.7E-02        2.2E-02
                         4.0E-02          5.4E-03          1.6E-03          15
                           991               0               312

06:14----06:44           1.0E-06          1.6E-03          8.2E-02        2.8E-02
                         6.5E-02          5.5E-03          2.7E-03          15
                           991               0               307

06:29----06:59           1.0E-06          4.3E-03          1.3E-01        3.2E-02
                         1.1E-01          7.7E-03          3.2E-03          17
                           991               0                32

06:44----07:14           1.0E-06          5.0E-03          1.0E-01        2.6E-02
                         8.4E-02          1.1E-02          3.3E-03          18
                           991               0               359

06:59----07:29           1.0E-06          4.4E-03          1.1E-01        3.2E-02
                         8.6E-02          1.2E-02          3.9E-03          19
                           991               0               360

07:14----07:44           1.0E-06          6.5E-03          1.9E-01        7.0E-02
                         1.3E-01          1.2E-02          4.7E-03          19
                           991               0               205

07:29----07:59           1.0E-06          6.7E-03          1.6E-01        7.0E-02
                         1.0E-01          2.1E-02          6.3E-03          20
                           991               0               204

07:44----08:14           1.0E-06          4.1E-03          8.6E-02        4.2E-02
                         5.7E-02          3.6E-02          8.1E-03          21
                           991               0                75

07:59----08:29           1.0E-06          1.8E-03          6.8E-02        3.9E-02
                         3.9E-02          4.5E-02          9.2E-03          22
                           991               0               217

08:14----08:44           1.0E-06          3.7E-04          3.4E-02        1.8E-02
                         1.9E-02          5.4E-02          1.6E-02          23
                           991               1               215

08:29----08:59           1.0E-06          2.2E-04          2.3E-02        1.3E-02
                         1.5E-02          6.3E-02          2.0E-02          24
                           991               2               210

08:44----09:14           1.0E-06          1.3E-04          2.9E-02        2.7E-02
                         1.0E-02          6.7E-02          1.9E-02          25
                           991               3               199
```

```
     TIME            H2S            SO2            NOX           NO2
                     NO            OZONE        SOLAR RAD        TEMP
                  BAROMETER     WIND SPEED   WIND DIRECTION

8:59-----09:29     1.0E-06        2.8E-04        3.7E-02       3.1E-02
                   1.4E-02        6.6E-02        2.2E-02         25
                     991              3            192

9:14-----09:44     1.0E-06        1.0E-03        3.6E-02       2.3E-02
                   1.9E-02        6.7E-02        2.7E-02         26
                     991              3            195


                               STATISTICS


UMBER OF READINGS 652

OLLUTANT              MINIMUM    MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                       VALUE      VALUE       MEAN     DEVIATION  MEAN    STD. DEV.

2S                   1.00E-06   3.70E-02   1.20E-03   4.86E-03   2.36E-06  1.42E+01
02                   1.00E-06   1.14E-02   2.71E-03   2.77E-03   2.97E-04  3.62E+01
0X                   1.21E-02   4.31E-01   9.55E-02   8.60E-02   6.42E-02  2.51E+00
02                   1.00E-06   4.66E-01   4.50E-02   6.70E-02   2.20E-03  1.06E+02
0                    7.59E-04   3.53E-01   6.07E-02   6.22E-02   3.37E-02  3.31E+00
ZONE                 1.87E-03   8.21E-02   3.11E-02   2.45E-02   2.09E-02  2.61E+00
OLAR RAD             1.00E-06   4.18E-02   4.04E-03   7.92E-03   8.70E-05  3.60E+01
EMP                      13         27         18          3
AROMETER                991        993        991          0        991         1
IND SPEED                 0          9          1          1          0        16
```

```
                                  ESPANOLA #4

DATE:               JUL  6 1978
SCAN TIME:          60    SEC
AVERAGING TIME:     30    MIN
LOCATION:
OLD NAIRN RD & RAILWAY CROSSING(04408-51246); 0.9KM & 350DGS SRC

        TIME            H2S           THC             SO2          THC-CH4
                        CH4           NOX             NO2            NO
                       OZONE       SOLAR RAD          TEMP         HUMIDITY
                     BAROMETER    WIND SPEED    WIND DIRECTION

12:15----12:45        4.1E-03       3.3E+00        5.4E-04        1.8E+00
                      1.2E+00       3.8E-02        2.6E-02        1.7E-02
                      8.2E-02       6.8E-02          31              66
                        990           11             217

12:25----12:55        7.4E-03       3.0E+00        8.6E-05        1.5E+00
                      1.2E+00       2.9E-02        2.4E-02        7.8E-03
                      8.6E-02       6.4E-02          31              67
                        990           12             221

12:35----13:05        1.0E-02       2.8E+00        7.4E-05        1.5E+00
                      1.2E+00       3.6E-02        3.4E-02        7.7E-03
                      8.7E-02       6.5E-02          31              66
                        990           12             227

12:45----13:15        1.2E-02       3.2E+00        2.8E-04        1.8E+00
                      1.2E+00       4.5E-02        4.6E-02        8.9E-03
                      8.8E-02       6.8E-02          32              64
                        990           11             231

12:55----13:25        1.3E-02       3.3E+00        5.9E-04        1.8E+00
                      1.2E+00       4.4E-02        4.3E-02        9.8E-03
                      8.8E-02       6.7E-02          32              64
                        990           12             232

13:05----13:35        1.4E-02       3.4E+00        7.3E-04        1.8E+00
                      1.2E+00       4.8E-02        4.1E-02        1.4E-02
                      8.8E-02       5.7E-02          32              64
                        990           12             231
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SPANOLA #4 CONT'D                                               PAGE 2


                               STATISTICS


UMBER OF READINGS: 82

OLLUTANT                 MINIMUM    MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                          VALUE      VALUE       MEAN    DEVIATION  MEAN     STD. DEV.

2S                      1.00E-06   1.87E-02   9.95E-03   5.19E-03  4.67E-03  1.20E+01
HC                      2.44E+00   1.11E+01   3.21E+00   1.67E+00  3.00E+00  1.37E+00
O2                      1.00E-06   2.83E-03   5.01E-04   6.75E-04  4.92E-05  2.37E+01
HC-CH4                  1.22E+00   7.28E+00   1.71E+00    1.00E+00  1.57E+00  1.40E+0
H4                      1.10E+00   1.32E+00   1.17E+00   3.18E-02  1.17E+00  1.03E+00
OX                      1.39E-02   3.59E-01   4.21E-02   4.98E-02  3.09E-02  1.97E+00
O2                      1.00E-06   4.55E-01   3.39E-02   5.66E-02  7.92E-03  2.44E+01
O                       6.22E-04   1.29E-01   1.42E-02   2.07E-02  7.53E-03  2.95E+00
ZONE                    5.73E-02   9.37E-02   8.56E-02   5.54E-03  8.55E-02  1.07E+00
OLAR RAD                4.02E-02   8.33E-02   6.27E-02   1.30E-02  6.13E-02  1.25E+00
EMP                          30         33         32          1
UMIDITY                      57         70         65          3        65          1
AROMETER                    989        990        990          0       990          1
IND SPEED                     5         22         12          4        11          1
```

```
                              ESPANOLA #5


DATE:                JUL  6 1978
SCAN TIME:           60    SEC
AVERAGING TIME:      30    MIN
LOCATION:
OLD NAIRN RD, 0.8 KM E OF RAIL TRACKS(04414-51245);0.9KM & 040DGS/SRC

      TIME               H2S            THC              SO2          THC-CH4
                         CH4            NOX              NO2            NO
                        OZONE        SOLAR RAD           TEMP        HUMIDITY
                      BAROMETER     WIND SPEED    WIND DIRECTION

13:53----14:23         2.3E-02        5.8E+00          5.9E-03        3.4E+00
                       1.3E+00        3.9E-01          2.0E-01        2.6E-01
                       4.5E-02        1.4E-02            30             70
                         990             0              226

14:08----14:38         2.5E-02        5.2E+00          8.7E-03        3.0E+00
                       1.2E+00        3.6E-01          2.1E-01        2.4E-01
                       4.9E-02        2.5E-02            31             68
                         990             1              221

14:23----14:53         2.5E-02        4.4E+00          8.3E-03        2.5E+00
                       1.2E+00        2.9E-01          1.5E-01        1.7E-01
                       5.6E-02        3.2E-02            32             66
                         990             1              216

14:38----15:08         1.9E-02        3.5E+00          3.1E-03        2.0E+00
                       1.1E+00        1.5E-01          7.7E-02        8.8E-02
                       6.4E-02        2.5E-02            30             70
                         990             1              197

14:53----15:23         1.6E-02        3.9E+00          1.0E-03        2.2E+00
                       1.1E+00        2.0E-01          1.2E-01        9.5E-02
                       6.2E-02        2.0E-02            29             73
                         990             1              192

15:08----15:38         1.4E-02        4.7E+00          2.8E-03        2.7E+00
                       1.1E+00        3.5E-01          1.8E-01        1.9E-01
                       5.2E-02        2.2E-02            31             67
                         990             1              248

15:23----15:53         1.3E-02        4.2E+00          3.6E-03        2.3E+00
                       1.1E+00        2.5E-01          1.0E-01        1.8E-01
                       5.8E-02        2.8E-02            31             64
                         990             1              234

15:38----16:08         1.2E-02        3.5E+00          1.5E-03        1.9E+00
                         1.0E+00        1.5E-01          7.1E-02        1.2E-01
                       6.6E-02        2.9E-02            30             67
                         990             1              191
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                              STATISTICS

NUMBER OF READINGS 143

POLLUTANT              MINIMUM   MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                        VALUE     VALUE      MEAN     DEVIATION  MEAN     STD. DEV.

H2S                   4.94E-03  3.02E-02  1.78E-02  5.93E-03  1.68E-02  1.43E+00
THC                   2.42E+00  1.34E+01  4.31E+00  2.20E+00  3.91E+00  1.52E+00
SO2                   1.00E-06  1.36E-02  3.93E-03  3.68E-03  3.80E-04  4.92E+01
THC-CH4               1.30E+00  6.70E+00  2.48E+00  1.25E+00  2.23E+00  1.55E+00
CH4                   9.11E-01  1.42E+00  1.11E+00  1.13E-01  1.11E+00  1.11E+00
NOX                   2.95E-02  1.10E+00  2.56E-01  2.44E-01  1.59E-01  2.79E+00
NO2                   1.00E-06  9.29E-01  1.31E-01  2.07E-01  4.05E-03  1.71E+02
NO                    1.19E-02  7.94E-01  1.60E-01  1.56E-01  8.88E-02  3.31E+00
OZONE                 1.82E-02  8.42E-02  5.77E-02  1.61E-02  5.50E-02  1.38E+00
SOLAR RAD             1.25E-02  4.64E-02  2.35E-02  7.64E-03  2.23E-02  1.37E+00
TEMP                        27        33        30         1
HUMIDITY                    56       106        69         6        69         1
BAROMETER                  990       990       990         0       990         1
WIND SPEED                   0         6         1         1         1         6
```

```
                                   ESPANOLA #6

DATE:            JUL  6 1978
SCAN TIME:       60    SEC
AVERAGING TIME:  30    MIN
LOCATION:
OLD NAIRN RD & RAILWAY CROSSING(04408-51246); 0.9KM & 350DGS/SRC

       TIME          H2S            THC            SO2           THC-CH4
                     CH4            NOX            NO2             NO
                   OZONE         SOLAR RAD         TEMP         HUMIDITY
                  BAROMETER     WIND SPEED   WIND DIRECTION

16:52----17:22      2.4E-02        3.9E+00        4.7E-03        2.7E+00
                    9.9E-01        6.5E-02        4.3E-02        3.0E-02
                    8.6E-02        2.0E-02           30             65
                      990             13            221

17:07----17:37      1.7E-02        3.9E+00        6.7E-03        3.0E+00
                    1.0E+00        7.8E-02        6.9E-02        2.0E-02
                    8.7E-02        1.6E-02           29             67
                      989             13            218

17:22----17:52      1.6E-02        4.4E+00        1.6E-02        3.3E+00
                    1.1E+00        1.0E-01        9.4E-02        2.5E-02
                    8.6E-02        1.6E-02           28             72
                      989             12            217

17:37----18:07      1.6E-02        4.5E+00        2.6E-02        3.3E+00
                    1.1E+00        8.0E-02        7.1E-02        2.1E-02
                    8.9E-02        1.7E-02           27             76
                      989             12            214

17:52----18:22      1.3E-02        4.0E+00        2.7E-02        3.1E+00
                    1.0E+00        4.4E-02        4.5E-02        7.0E-03
                    9.6E-02        1.8E-02           27             77
                      989             10            211

18:07----18:37      6.1E-03        4.4E+00        2.0E-02        3.2E+00
                    1.1E+00        5.6E-02        5.7E-02        1.1E-02
                    9.6E-02        1.7E-02           27             74
                      989              6            209

18:22----18:52      1.6E-03        4.7E+00        2.1E-02        3.3E+00
                    1.2E+00        7.5E-02        7.3E-02        1.8E-02
                    9.3E-02        1.3E-02           28             73
                      988              6            218

18:37----19:07      8.8E-04        4.4E+00        2.5E-02        3.1E+00
                    1.1E+00        7.2E-02        7.1E-02        1.7E-02
                    9.6E-02        9.9E-03           27             76
                      989             10            218
```

STATISTICS

NUMBER OF READINGS 144

POLLUTANT	MINIMUM VALUE	MAXIMUM VALUE	ARITHMETIC MEAN	STANDARD DEVIATION	GEOMETRIC MEAN	GEOMETRIC STD. DEV.
H2S	1.00E-06	3.54E-02	1.14E-02	9.50E-03	2.40E-03	2.82E+01
THC	3.12E+00	1.10E+01	4.27E+00	1.32E+00	4.12E+00	1.28E+00
SO2	3.25E-03	3.73E-02	1.79E-02	9.87E-03	1.45E-02	2.05E+00
THC-CH4	2.14E+00	8.55E+00	3.10E+00	9.34E-01	3.01E+00	1.27E+00
CH4	8.70E-01	1.90E+00	1.08E+00	2.08E-01	1.07E+00	1.18E+00
NOX	1.92E-02	2.70E-01	6.95E-02	4.77E-02	5.82E-02	1.78E+00
NO2	1.00E-06	3.15E-01	6.28E-02	5.31E-02	3.11E-02	1.02E+01
NO	1.98E-03	2.54E-01	1.91E-02	2.96E-02	1.14E-02	2.47E+00
OZONE	6.00E-02	1.08E-01	9.18E-02	8.60E-03	9.14E-02	1.10E+00
SOLAR RAD	2.77E-04	3.26E-02	1.49E-02	6.04E-03	1.31E-02	1.90E+00
TEMP	21	31	28	1		
HUMIDITY	60	155	74	9	73	1
BAROMETER	988	990	989	0	989	1
WIND SPEED	1	23	11	5	9	2

```
                                    ESPANOLA #7

DATE:               JUL  6 1978
SCAN TIME:          150   SEC
AVERAGING TIME:     30    MIN
LOCATION:
OLD NAIRN RD, 1 KM E OF RAILWAY TRACKS(04415-51244); 1 KM & 040DGS/SRC

      TIME               H2S             THC              SO2          THC-CH4
                         CH4             NOX              NO2            NO
                        OZONE         SOLAR RAD           TEMP        HUMIDITY
                      BAROMETER      WIND SPEED     WIND DIRECTION

19:36-----20:06        9.0E-04         4.3E+00          1.3E-02        3.6E+00
                       1.3E+00         5.2E-02          3.9E-02        1.9E-02
                       9.9E-02         3.6E-03            25             83
                         988              2               192

19:51-----20:21        1.4E-03         4.6E+00          1.2E-02        3.0E+00
                       1.2E+00         4.7E-02          3.0E-02        2.0E-02
                       9.8E-02         3.9E-03            25             85
                         988              3               202

20:06-----20:36        1.9E-03         4.8E+00          1.1E-02        3.6E+00
                       1.3E+00         4.9E-02          3.1E-02        2.0E-02
                       9.7E-02         3.3E-03            25             83
                         988              5               214

20:21-----20:51        1.6E-03         4.3E+00          9.2E-03        3.6E+00
                       1.2E+00         4.7E-02          3.7E-02        1.4E-02
                       9.9E-02         2.9E-03            24             87
                         988              6               213

20:36-----21:06        9.8E-04         4.4E+00          8.0E-03        3.7E+00
                       1.2E+00         5.2E-02          4.8E-02        1.4E-02
                       9.7E-02         2.0E-03            23             93
                         988              5               204

20:51-----21:21        3.1E-04         4.5E+00          7.5E-03        3.5E+00
                       1.1E+00         4.9E-02          4.9E-02        9.9E-03
                       9.7E-02         5.4E-04            23             92
                         988              3               197

21:06-----21:36        1.7E-04         4.4E+00          7.5E-03        3.1E+00
                       1.1E+00         4.4E-02          4.3E-02        1.0E-02
                       9.8E-02         2.7E-04            23             92
                         988              2               192

21:21-----21:51        4.7E-04         4.9E+00          8.0E-03        3.9E+00
                       1.2E+00         4.7E-02          3.8E-02        2.0E-02
                       9.0E-02         9.7E-05            23             94
                         988              1               196

21:36-----22:06        4.7E-04         5.8E+00          9.0E-03        4.8E+00
                       1.4E+00         5.9E-02          3.9E-02        2.7E-02
                       8.1E-02         2.3E-05            22             97
                         988              1               201

21:51-----22:21        1.0E-06         5.5E+00          9.1E-03        4.0E+00
                       1.3E+00         6.3E-02          5.0E-02        2.0E-02
                       8.2E-02         5.3E-06            22             99
                         988              1               207
```

```
        TIME              H2S              THC              SO2           THC-CH4
                          CH4              NOX              NO2             NO
                         OZONE          SOLAR RAD           TEMP          HUMIDITY
                       BAROMETER        WIND SPEED     WIND DIRECTION

22:06----22:36          1.0E-06          4.9E+00          8.7E-03         3.9E+00
                        1.2E+00          5.8E-02          5.4E-02         1.7E-02
                        7.9E-02          1.0E-06            22              100
                          989               1               212

22:21----22:51          1.0E-06          6.1E+00          9.6E-03         4.6E+00
                        1.4E+00          8.2E-02          8.8E-02         1.6E-02
                        7.3E-02          1.0E-06            22              104
                          989               1               215

22:36----23:06          1.0E-06          6.5E+00          1.0E-02         4.9E+00
                        1.4E+00          9.8E-02          1.0E-01         2.2E-02
                        7.3E-02          1.6E-06            21              108
                          989               0               212

22:51----23:21          1.0E-06          7.0E+00          1.0E-02         5.7E+00
                        1.5E+00          1.1E-01          1.1E-01         3.1E-02
                        6.6E-02          1.6E-06            21              110
                          989               0               208

23:06----23:36          1.0E-06          7.4E+00          1.1E-02         6.0E+00
                        1.6E+00          1.2E-01          9.9E-02         3.9E-02
                        5.8E-02          1.1E-06            21              113
                          989               0               205

23:21----23:51          1.0E-06          7.9E+00          1.1E-02         5.9E+00
                        1.7E+00          1.3E-01          6.8E-02         6.8E-02
                        4.6E-02          1.1E-06            20              117
                          989               0               204

23:36----00:06          1.0E-06          7.7E+00          9.8E-03         5.8E+00
                        1.7E+00          1.2E-01          5.1E-02         7.5E-02
                        2.8E-02          1.0E-06            19              123
                          989               0               169

23:51----00:21          1.0E-06          8.1E+00          9.5E-03         6.7E+00
                        1.9E+00          1.3E-01          5.4E-02         7.9E-02
                        1.7E-02          1.0E-06            18              127
                          989               0               165

00:06----00:36          1.0E-06          9.0E+00          9.9E-03         7.2E+00
                        2.1E+00          1.6E-01          6.7E-02         9.8E-02
                        1.7E-02          1.0E-06            18              129
                          990               0               145

00:21----00:51          1.0E-06          8.5E+00          9.9E-03         6.2E+00
                        1.9E+00          1.6E-01          6.4E-02         1.0E-01
                        1.5E-02          1.0E-06            17              131
                          990               0                81

00:36----01:06          1.0E-06          8.5E+00          1.0E-02         5.9E+00
                        1.9E+00          1.7E-01          5.5E-02         1.2E-01
                        1.1E-02          1.0E-06            17              132
                          990               0               352
```

```
      TIME              H2S           THC            SO2           THC-CH4
                        CH4           NOX            NO2             NO
                       OZONE       SOLAR RAD         TEMP         HUMIDITY
                     BAROMETER     WIND SPEED   WIND DIRECTION

  00:51----01:21      1.0E-06       8.6E+00        1.0E-02        6.4E+00
                      2.0E+00       1.8E-01        3.7E-02        1.4E-01
                      1.1E-02       1.6E-06          17             132
                        990            0             351

  01:06----01:36      1.0E-06       7.4E+00        9.0E-03        5.9E+00
                      1.8E+00       1.4E-01        4.7E-02        9.2E-02
                      1.2E-02       6.5E-06          17             134
                        990            0              22

  01:21----01:51      1.0E-06       6.6E+00        8.1E-03        5.3E+00
                      1.6E+00       1.3E-01        6.3E-02        7.9E-02
                      1.4E-02       1.3E-05          17             136
                        990            0             135

  01:36----02:06      1.0E-06       7.6E+00        8.5E-03        5.9E+00
                      1.8E+00       1.6E-01        4.8E-02        1.1E-01
                      1.1E-02       1.2E-05          17             136
                        990            0             175

  01:51----02:21      1.0E-06       8.0E+00        8.9E-03        6.2E+00
                      1.9E+00       1.7E-01        3.8E-02        1.2E-01
                      7.0E-03       8.4E-06          16             136
                        990            0             348

  02:06----02:36      1.0E-06       7.7E+00        8.8E-03        5.8E+00
                      1.8E+00       1.6E-01        3.3E-02        1.2E-01
                      7.6E-03       9.6E-06          16             136
                        990            0             216

  02:21----02:51      1.0E-06       7.8E+00        8.6E-03        6.1E+00
                      1.8E+00       1.6E-01        3.4E-02        1.3E-01
                      7.9E-03       1.3E-05          16             135
                        990            0             191

  02:36----03:06      1.0E-06       7.2E+00        8.2E-03        5.8E+00
                      1.8E+00       1.6E-01        3.9E-02        1.2E-01
                      8.7E-03       1.3E-05          16             136
                        990            0              36

  02:51----03:21      1.0E-06       8.0E+00        8.3E-03        6.4E+00
                      1.9E+00       1.9E-01        4.6E-02        1.3E-01
                      8.1E-03       1.3E-05          16             136
                        990            0              30

  03:06----03:36      1.0E-06       9.7E+00        9.1E-03        7.7E+00
                      2.3E+00       2.3E-01        5.1E-02        1.6E-01
                      4.8E-03       1.8E-05          16             137
                        990            0              14

  03:21----03:51      1.0E-06       9.5E+00        8.8E-03        7.2E+00
                      2.3E+00       2.2E-01        6.0E-02        1.5E-01
                      9.1E-03       2.3E-05          16             137
                        990            0             152
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     TIME              H2S            THC             SO2           THC-CH4
                       CH4            NOX             NO2             NO
                      OZONE        SOLAR RAD          TEMP          HUMIDITY
                    BAROMETER      WIND SPEED   WIND DIRECTION

03:36----04:06       1.0E-06         9.3E+00         8.6E-03        7.0E+00
                     2.2E+00         2.1E-01         5.5E-02        1.5E-01
                     1.1E-02         1.7E-05           16             137
                       990              0             156

03:51----04:21       1.0E-06         8.5E+00         8.3E-03        6.8E+00
                     2.1E+00         2.0E-01         5.3E-02        1.4E-01
                     7.0E-03         1.1E-05           16             137
                       990              0              18

04:06----04:36       1.0E-06         7.4E+00         7.7E-03        5.9E+00
                     1.8E+00         1.7E-01         5.6E-02        1.2E-01
                     9.6E-03         1.7E-05           16             137
                       990              0              12

04:21----04:51       1.0E-06         8.3E+00         8.9E-03        6.4E+00
                     2.0E+00         1.9E-01         2.5E-02        1.5E-01
                     7.9E-03         1.9E-05           16             138
                       990              0              13

04:36----05:06       1.0E-06         8.8E+00         9.4E-03        7.0E+00
                     2.2E+00         2.0E-01         1.6E-02        1.7E-01
                     3.9E-03         1.5E-05           16             137
                       990              0              27

04:51----05:21       1.0E-06         9.4E+00         9.4E-03        7.5E+00
                     2.3E+00         2.2E-01         1.8E-02        1.8E-01
                     2.9E-03         1.7E-05           16             137
                       990              0              50

05:06----05:36       1.0E-06         1.0E+01         1.0E-02        7.5E+00
                     2.4E+00         2.4E-01         2.6E-02        1.9E-01
                     3.2E-03         4.8E-05           16             137
                       990              0              14

05:21----05:51       1.0E-06         8.6E+00         9.7E-03        6.5E+00
                     2.1E+00         2.2E-01         4.8E-02        1.7E-01
                     4.9E-03         1.8E-04           17             137
                       990              0              16

05:36----06:06       1.0E-06         8.3E+00         9.1E-03        6.6E+00
                     2.1E+00         2.1E-01         5.8E-02        1.5E-01
                     3.7E-03         5.4E-04           17             136
                       990              0              15

05:51----06:21       1.0E-06         8.2E+00         9.0E-03        6.3E+00
                     2.0E+00         2.0E-01         4.5E-02        1.4E-01
                     2.3E-03         1.2E-03           16             136
                       990              0             345

06:06----06:36       1.0E-06         7.5E+00         9.1E-03        5.8E+00
                     1.8E+00         1.8E-01         2.7E-02        1.4E-01
                     2.0E-03         2.2E-03           17             136
                       990              0             324
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ESPANOLA #7, CONT'D

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        TIME              H2S             THC             SO2          THC-CH4
                          CH4             NOX             NO2            NO
                         OZONE         SOLAR RAD          TEMP        HUMIDITY
                       BAROMETER       WIND SPEED    WIND DIRECTION

   06:21----06:51        1.0E-06         7.7E+00         8.9E-03        5.9E+00
                         1.9E+00         1.8E-01         2.4E-02        1.4E-01
                         3.3E-03         3.5E-03           17             135
                           990              0             328

   06:36----07:06        1.0E-06         7.6E+00         8.4E-03        5.8E+00
                         1.8E+00         1.7E-01         2.8E-02        1.3E-01
                         3.6E-03         3.8E-03           18             135
                           990              0             330

   06:51----07:21        1.0E-06         7.7E+00         8.2E-03        5.5E+00
                         1.8E+00         1.7E-01         3.2E-02        1.4E-01
                         3.7E-03         3.1E-03           18             134
                           990              0             322

   07:06----07:36        1.0E-06         7.2E+00         7.2E-03        5.1E+00
                         1.7E+00         1.6E-01         5.2E-02        1.1E-01
                         6.3E-03         2.7E-03           18             133
                           990              0             111

   07:21----07:51        1.0E-06         6.3E+00         6.3E-03        5.0E+00
                         1.6E+00         1.3E-01         4.4E-02        8.7E-02
                         6.4E-03         2.9E-03           18             134
                           990              0             163

   07:36----08:06        1.0E-06         6.3E+00         6.2E-03        5.1E+00
                         1.6E+00         1.4E-01         2.6E-02        1.1E-01
                         3.5E-03         4.3E-03           19             135
                           990              0             201

   07:51----08:21        1.0E-06         6.2E+00         6.9E-03        5.0E+00
                         1.6E+00         1.3E-01         2.5E-02        1.1E-01
                         3.8E-03         7.0E-03           19             133
                           990              0             173

   08:06----08:36        1.0E-06         5.4E+00         6.6E-03        4.3E+00
                         1.4E+00         1.1E-01         2.5E-02        8.0E-02
                         1.1E-02         9.4E-03           20             131
                           990              0             223

   08:21----08:51        1.0E-06         5.6E+00         5.7E-03        4.3E+00
                         1.5E+00         9.7E-02         3.1E-02        6.4E-02
                         1.5E-02         1.1E-02           21             129
                           990              0              86

   08:36----09:06        1.0E-06         6.6E+00         5.8E-03        5.1E+00
                         1.7E+00         1.2E-01         4.3E-02        8.0E-02
                         1.8E-02         1.1E-02           22             126
                           990              0              67
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STATISTICS

NUMBER OF READINGS 327

POLLUTANT	MINIMUM VALUE	MAXIMUM VALUE	ARITHMETIC MEAN	STANDARD DEVIATION	GEOMETRIC MEAN	GEOMETRIC STD. DEV.
H2S	1.00E-06	4.73E-03	1.62E-04	5.88E-04	2.10E-06	8.92E+00
THC	3.27E+00	1.36E+01	7.12E+00	2.19E+00	6.77E+00	1.38E+00
SO2	4.34E-03	1.49E-02	8.85E-03	1.75E-03	8.68E-03	1.23E+00
THC-CH4	2.24E+00	1.06E+01	5.51E+00	1.77E+00	5.20E+00	1.42E+00
CH4	9.23E-01	2.94E+00	1.72E+00	4.37E-01	1.67E+00	1.30E+00
NOX	1.86E-02	4.03E-01	1.39E-01	7.19E-02	1.17E-01	1.92E+00
NO2	1.00E-06	2.31E-01	4.65E-02	4.23E-02	6.33E-03	6.32E+01
NO	2.52E-03	2.80E-01	9.31E-02	6.51E-02	6.20E-02	2.93E+00
OZONE	4.47E-04	1.06E-01	3.17E-02	3.63E-02	1.36E-02	4.16E+00
SOLAR RAD	1.00E-06	1.57E-02	1.75E-03	3.23E-03	6.47E-05	2.79E+01
TEMP	16	25	19	3		
HUMIDITY	74	139	123	18	121	1
BAROMETER	988	990	989	1	989	1
WIND SPEED	0	10	1	1	0	17

```
                                   ESPANOLA #9


DATE:                JUL  7 1978
SCAN TIME:           60    SEC
AVERAGING TIME:      30    MIN
LOCATION:
OLD NAIRN RD, 0.5KM E OF RAIL TRACKS(04410-51245); 0.8KM & 020DGS/SRC

       TIME          H2S            THC             SO2           THC-CH4
                    CH4            NOX             NO2              NO
                   OZONE        SOLAR RAD          TEMP          HUMIDITY
                  BAROMETER     WIND SPEED    WIND DIRECTION

13:57----14:27      3.4E-02        3.7E+00         3.0E-03        2.5E+00
                    6.9E-01        1.0E-01         7.1E-02        5.3E-02
                    5.8E-02        4.4E-02            34             60
                      988             1               16

14:07----14:37      2.7E-02        4.7E+00         2.7E-03        2.6E+00
                    7.0E-01        1.5E-01         1.1E-01        7.1E-02
                    5.7E-02        5.0E-02            34             59
                      988             1              358

14:17----14:47      2.0E-02        5.1E+00         2.5E-03        2.6E+00
                    7.1E-01        1.6E-01         1.2E-01        8.6E-02
                    5.7E-02        5.8E-02            34             59
                      988             1               31

14:27----14:57      1.6E-02        4.6E+00         2.2E-03        1.8E+00
                    6.9E-01        1.3E-01         9.7E-02        8.2E-02
                    6.0E-02        6.4E-02            35             56
                      988             1               57


                              STATISTICS


NUMBER OF READINGS 67

POLLUTANT            MINIMUM   MAXIMUM  ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                      VALUE     VALUE      MEAN     DEVIATION MEAN      STD. DEV.

H2S                   1.21E-02  4.43E-02  2.40E-02  9.85E-03  2.22E-02  1.49E+00
THC                   1.80E+00  2.35E+01  4.04E+00  3.52E+00  3.30E+00  1.77E+00
SO2                   1.00E-06  4.59E-03  2.40E-03  1.18E-03  1.64E-03  4.62E+00
THC-CH4               9.96E-01  1.82E+01  2.17E+00  2.33E+00  1.76E+00  1.73E+00
CH4                   6.33E-01  8.56E-01  6.92E-01  4.78E-02  6.91E-01  1.07E+00
NOX                   1.90E-02  3.69E-01  1.12E-01  8.88E-02  8.10E-02  2.31E+00
NO2                   1.00E-06  4.35E-01  7.68E-02  1.12E-01  1.91E-03  1.89E+02
NO                    3.52E-03  4.26E-01  6.77E-02  7.84E-02  3.87E-02  3.13E+00
OZONE                 3.49E-02  7.06E-02  5.95E-02  8.08E-03  5.89E-02  1.16E+00
SOLAR RAD             2.25E-02  7.69E-02  5.55E-02  1.39E-02  5.34E-02  1.34E+00
TEMP                      32        37        34         1
HUMIDITY                  49        66        58         4        58         1
BAROMETER                987       989       988         0       988         1
WIND SPEED                 0         7         2         2         1         8
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                                     ESPANOLA #12


DATE:              JUL  8 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION: PARK & CENTRE STS.(04407-51233); 0.5KM & 185DGS/SRC

        TIME              H2S              THC              SO2          THC-CH4
                          CH4              NOX              NO2            NO
                         OZONE          SOLAR RAD           TEMP        HUMIDITY
                       BAROMETER       WIND SPEED    WIND DIRECTION

16:43----17:13          3.7E-02          1.6E+00          1.0E-06        1.1E+00
                        5.0E-01          8.9E-02          3.7E-02        5.3E-02
                        2.5E-02          6.2E-02            30             55
                          988               9               4

16:58----17:28          3.2E-02          1.7E+00          1.9E-04        1.1E+00
                        5.1E-01          9.8E-02          4.4E-02        6.3E-02
                        2.4E-02          5.8E-02            30             54
                          988              10               1

17:13----17:43          2.4E-02          1.7E+00          7.4E-04         1.0E+00
                        5.2E-01          8.8E-02          4.7E-02        5.4E-02
                        2.3E-02          5.5E-02            30             54
                          988              10               9

17:28----17:58          1.9E-02          1.8E+00          3.8E-03        1.1E+00
                        5.3E-01          1.1E-01          8.8E-02        7.0E-02
                        2.1E-02          4.2E-02            30             53
                          988               8              21

17:43----18:13          2.0E-02          1.7E+00          6.2E-03        9.8E-01
                        5.2E-01          1.1E-01          8.4E-02        6.2E-02
                        2.4E-02          3.8E-02            30             54
                          989               9              21
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ESPANOLA #12 CONT'D

STATISTICS

NUMBER OF READINGS 95

POLLUTANT	MINIMUM VALUE	MAXIMUM VALUE	ARITHMETIC MEAN	STANDARD DEVIATION	GEOMETRIC MEAN	GEOMETRIC STD. DEV.
H2S	8.61E-03	4.59E-02	2.63E-02	9.50E-03	2.44E-02	1.49E+00
THC	1.13E+00	4.16E+00	1.72E+00	5.07E-01	1.66E+00	1.29E+00
SO2	1.00E-06	1.70E-02	2.72E-03	3.97E-03	4.56E-05	7.07E+01
THC-CH4	5.72E-01	4.65E+00	1.02E+00	6.05E-01	9.37E-01	1.44E+00
CH4	4.40E-01	7.57E-01	5.17E-01	4.84E-02	5.15E-01	1.09E+00
NOX	3.63E-02	5.14E-01	9.28E-02	6.40E-02	8.18E-02	1.58E+00
NO2	1.00E-06	1.07E+00	5.44E-02	1.22E-01	5.74E-03	5.73E+01
NO	1.61E-02	3.82E-01	5.53E-02	4.53E-02	4.70E-02	1.67E+00
OZONE	7.97E-03	3.34E-02	2.40E-02	4.61E-03	2.35E-02	1.25E+00
SOLAR RAD	8.89E-03	6.74E-02	5.14E-02	1.32E-02	4.86E-02	1.48E+00
TEMP	28	32	30	1		
HUMIDITY	50	60	54	2	54	1
BAROMETER	987	989	988	0	988	1
WIND SPEED	2	20	9	4	9	2

```
                      ESPANOLA #18


DATE:      JUL 11 1978
SCAN TIME:      60   SEC
AVERAGING TIME:  30   MIN
LOCATION: SECOND AVE., OPPOSITE #99(04417-51227); 1.2KM & 160DGS/SRC

     TIME            THC      THC-CH4       CH4        NOX
                     NO2        NO         OZONE    SOLAR RAD
                    TEMP     HUMIDITY    BAROMETER  WIND SPEED
                WIND DIRECTION

15:14-----15:44    2.3E+00    1.2E+00     7.0E-01    1.7E-02
                   1.4E-02    6.5E-03     3.0E-02    7.1E-02
                     30         39          993         9
                    279

15:29-----15:59    2.3E+00    1.3E+00     6.7E-01    1.3E-02
                   1.0E-02    5.7E-03     3.1E-02    7.2E-02
                     27         57          993        10
                    257

15:44-----16:14    2.7E+00    1.8E+00     6.4E-01    2.4E-02
                   2.1E-02    9.5E-03     3.2E-02    7.2E-02
                     26         54          993        10
                    246

15:59-----16:29    2.7E+00    1.7E+00     6.0E-01    2.6E-02
                   2.3E-02    9.8E-03     3.2E-02    7.4E-02
                     27         42          993         9
                    239

16:14-----16:44    2.3E+00    1.4E+00     5.6E-01    1.6E-02
                   1.4E-02    6.3E-03     3.3E-02    7.5E-02
                     27         41          993         9
                    236

16:29-----16:59    2.2E+00    1.4E+00     5.3E-01    1.4E-02
                   1.2E-02    5.2E-03     3.3E-02    6.9E-02
                     26         41          993        11
                    233

16:44-----17:14    2.1E+00    1.2E+00     5.1E-01    1.2E-02
                   8.7E-03    5.0E-03     3.3E-02    6.4E-02
                     26         42          993        14
                    245
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                              STATISTICS

NUMBER OF READINGS 125

POLLUTANT              MINIMUM    MAXIMUM   ARITHMETIC  STANDARD  GEOMETRIC  GEOMETRIC
                        VALUE      VALUE       MEAN     DEVIATION   MEAN     STD. DEV.

THC                   1.81E+00   9.48E+00   2.34E+00   1.08E+00   2.21E+00   1.35E+00
THC-CH4               1.01E+00   1.29E+01   1.39E+00   1.14E+00   1.27E+00   1.48E+00
CH4                   4.73E-01   7.79E-01   5.96E-01   7.91E-02   5.91E-01   1.14E+00
NOX                   7.51E-03   1.72E-01   1.69E-02   2.04E-02   1.37E-02   1.65E+00
NO2                   1.00E-06   2.25E-01   1.41E-02   2.58E-02   [illegible].41E-03   1.71E+01
NO                    2.19E-03   5.45E-02   6.70E-03   6.57E-03   5.46E-03   1.73E+00
OZONE                 2.41E-02   3.45E-02   3.19E-02   1.67E-03   3.19E-02   1.06E+00
SOLAR RAD             1.13E-02   8.88E-02   7.05E-02   1.71E-02   6.71E-02   1.44E+00
TEMP                     25         32         27          2
HUMIDITY                 27        157         44         20         42          1
BAROMETER               993        993        993          0        993          1
WIND SPEED                1         27         12          5         10          2
```

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                              ESPANOLA #19

DATE:              JUL 11 1978
SCAN TIME:         150   SEC
AVERAGING TIME:    30    MIN
LOCATION: GOODMAN MOTEL, HWY #17(04401-51228); 2 KM & 340DGS/SRC

       TIME              THC             SO2            THC-CH4          CH4
                         NOX             NO2              NO             OZONE
                      SOLAR RAD          TEMP           HUMIDITY        BAROMETER
                      WIND SPEED   WIND DIRECTION

18:13----18:43         2.1E+00          3.7E-03         1.2E+00         4.2E-01
                       6.6E-03          6.9E-03         1.7E-03         3.5E-02
                       2.7E-02            21              39              989
                          4               280

18:23----18:53         2.1E+00          3.9E-03         1.3E+00         4.1E-01
                       6.6E-03          7.0E-03         1.7E-03         3.5E-02
                       2.9E-02            27              43              993
                          5               278

18:33----19:03         2.0E+00          4.1E-03         1.2E+00         4.0E-01
                       6.4E-03          6.8E-03         1.6E-03         3.5E-02
                       2.6E-02            27              44              993
                          5               277


                               STATISTICS


NUMBER OF READINGS 21

POLLUTANT              MINIMUM    MAXIMUM   ARITHMETIC   STANDARD  GEOMETRIC GEOMETRIC
                        VALUE      VALUE       MEAN      DEVIATION   MEAN     STD. DEV.

THC                   1.73E+00  2.89E+00  2.03E+00  3.06E-01  2.02E+00  1.15E+00
SO2                   3.30E-03  4.24E-03  3.86E-03  3.32E-04  3.84E-03  1.09E+00
THC-CH4               1.05E+00  1.92E+00  1.23E+00  2.01E-01  1.22E+00  1.16E+00
CH4                   3.95E-01  4.36E-01  4.10E-01  1.10E-02  4.10E-01  1.03E+00
NOX                   5.72E-03  7.61E-03  6.50E-03  5.73E-04  6.48E-03  1.09E+00
NO2                   5.26E-03  9.17E-03  6.93E-03  9.68E-04  6.87E-03  1.15E+00
NO                    9.32E-04  2.58E-03  1.61E-03  4.26E-04  1.56E-03  1.30E+00
OZONE                 3.45E-02  3.57E-02  3.52E-02  3.25E-04  3.52E-02  1.01E+00
SOLAR RAD             1.30E-03  3.82E-02  2.65E-02  7.99E-03  2.35E-02  1.99E+00
TEMP                     -40        28        23        15
HUMIDITY                   0        45        41        10        19        46
BAROMETER                950       993       990         9       990         1
WIND SPEED                 2         7         5         1         4         1
```

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                              ESPANOLA #21

DATE:              JUL 12 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION:
OLD NAIRN RD, 0.1KM E OF CREEK(04424-51246); 1.6KM & 070DGS/SRC

      TIME              THC             SO2           THC-CH4          CH4
                        NOX             NO2             NO            OZONE
                     SOLAR RAD          TEMP          HUMIDITY       BAROMETER
                    WIND SPEED    WIND DIRECTION

12:23----12:53        2.3E+00         2.0E-03         1.6E+00         5.9E-01
                      3.1E-02         1.5E-02         1.8E-02         3.9E-02
                      8.0E-02           28              36              995
                        13              138

12:38----13:08        2.3E+00         2.9E-04         1.6E+00         5.7E-01
                      3.1E-02         1.3E-02         1.9E-02         3.9E-02
                      6.2E-02           28              36              995
                        14              140

12:53----13:23        2.5E+00         5.7E-04         1.3E+00         5.7E-01
                      3.2E-02         1.3E-02         2.0E-02         3.9E-02
                      2.7E-02           28              36              995
                        14              139

13:08----13:38        2.4E+00         5.7E-04         1.3E+00         5.7E-01
                      3.1E-02         1.4E-02         1.9E-02         3.9E-02
                      3.1E-02           28              36              995
                        15              132

13:23----13:53        2.1E+00         1.0E-06         1.2E+00         5.7E-01
                      2.9E-02         1.2E-02         1.8E-02         4.0E-02
                      6.4E-02           27              36              995
                        17              135

13:38----14:08        2.2E+00         2.5E-05         1.2E+00         5.9E-01
                      3.0E-02         1.2E-02         1.9E-02         4.0E-02
                      7.7E-02           28              36              995
                        15              139

13:53----14:23        2.3E+00         2.6E-03         1.2E+00         6.9E-01
                      2.5E-02         1.3E-02         1.4E-02         4.1E-02
                      8.1E-02           28              36              995
                        14              141

14:08----14:38        2.5E+00         2.8E-03         1.5E+00         8.4E-01
                      1.7E-02         1.3E-02         6.9E-03         4.2E-02
                      8.5E-02           28              35              995
                        15              138

14:23----14:53        2.3E+00         2.3E-04         1.4E+00         1.0E+00
                      1.1E-02         8.5E-03         4.8E-03         4.3E-02
                      8.4E-02           28              34              995
                        14              136

14:38----15:08        2.4E+00         1.0E-06         1.0E+00         1.1E+00
                      1.0E-02         7.1E-03         5.0E-03         4.3E-02
                      8.2E-02           28              34              994
                        12              134
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SPANOLA #21, CONT'D                                          PAGE 2

      TIME           THC              SO2            THC-CH4          CH4
                     NOX              NO2              NO            OZONE
                  SOLAR RAD           TEMP           HUMIDITY       BAROMETER
                  WIND SPEED   WIND DIRECTION



                             STATISTICS


UMBER OF READINGS 166

OLLUTANT               MINIMUM    MAXIMUM   ARITHMETIC  STANDARD  GEOMETRIC  GEOMETRIC
                        VALUE      VALUE       MEAN     DEVIATION   MEAN     STD. DEV.

HC                    1.93E+00   1.23E+01   2.35E+00   1.19E+00   2.23E+00   1.30E+00
O2                    1.00E-06   1.11E-02   9.80E-04   2.05E-03   1.13E-05   3.62E+01
HC-CH4                8.64E-01   1.18E+01   1.33E+00   1.02E+00   1.22E+00   1.38E+00
H4                    5.39E-01   1.26E+00   7.34E-01   2.31E-01   7.04E-01   1.33E+00
OX                    1.00E-06   5.39E-02   2.43E-02   1.03E-02   2.06E-02   2.53E+00
O2                    1.00E-06   4.42E-02   1.20E-02   5.86E-03   9.87E-03   3.01E+00
O                     3.12E-03   3.24E-02   1.41E-02   6.85E-03   1.19E-02   1.90E+00
ZONE                  3.71E-02   4.45E-02   4.06E-02   1.82E-03   4.06E-02   1.05E+00
OLAR RAD              6.19E-03   8.78E-02   6.86E-02   2.52E-02   5.90E-02   1.97E+00
EMP                         27         29         28          0
UMIDITY                     33         38         36          1         36          1
AROMETER                   994        995        995          0        995          1
IND SPEED                    5         26         15          5         14          1
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                                   ESPANOLA #22

DATE:              JUL 12 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION:
OLD NAIRN RD & RAILWAY CROSSING(04408-51246); 0.9KM & 350DGS/ERC

      TIME             THC           THC-CH4          CH4            NOX
                       NO2             NO            OZONE        SOLAR RAD
                      TEMP          HUMIDITY       BAROMETER      WIND SPEED
                 WIND DIRECTION

17:03----17:33       2.1E+00        1.1E+00        9.2E-01        2.2E-02
                     9.9E-03        1.4E-02        4.7E-02        5.4E-02
                        25             42            993             14
                       174

17:18----17:48       2.0E+00        1.1E+00        8.7E-01        2.7E-02
                     1.6E-02        1.4E-02        4.8E-02        5.4E-02
                        25             43            992             12
                       174

17:33----18:03       2.1E+00        1.1E+00        8.3E-01        2.4E-02
                     1.4E-02        1.3E-02        4.9E-02        5.5E-02
                        25             43            992             11
                       188

17:48----18:18       2.2E+00        1.2E+00        8.0E-01        2.0E-02
                     8.2E-03        1.5E-02        5.0E-02        5.2E-02
                        25             43            992             10
                       214

18:03----18:33       2.2E+00        1.2E+00        7.7E-01        2.1E-02
                     8.7E-03        1.5E-02        5.1E-02        4.9E-02
                        24             43            992             10
                       221
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ESPANOLA #22 CONT'D                                             PAGE 2


                              STATISTICS


NUMBER OF READINGS 99

POLLUTANT              MINIMUM    MAXIMUM  ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                        VALUE      VALUE      MEAN    DEVIATION  MEAN     STD. DEV.

THC                   1.84E+00  3.96E+00  2.13E+00  4.07E-01  2.10E+00  1.17E+00
THC-CH4               9.55E-01  2.48E+00  1.12E+00  2.78E-01  1.10E+00  1.21E+00
CH4                   7.22E-01  1.01E+00  8.30E-01  7.21E-02  8.27E-01  1.09E+00
NOX                   1.21E-02  7.68E-02  2.27E-02  1.26E-02  2.06E-02  1.50E+00
NO2                   1.00E-06  6.94E-02  1.15E-02  1.50E-02  1.37E-03  4.82E+01
NO                    3.49E-03  6.32E-02  1.43E-02  9.08E-03  1.24E-02  1.68E+00
OZONE                 3.84E-02  5.24E-02  4.91E-02  2.28E-03  4.90E-02  1.05E+00
SOLAR RAD             2.80E-02  6.00E-02  5.11E-02  5.82E-03  5.07E-02  1.14E+00
TEMP                       23         26         25         0
HUMIDITY                   39         45         42         1        42         1
BAROMETER                 992        993        992         0       992         1
WIND SPEED                  1         28         12         4        11         2
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                                  ESPANOLA #24

DATE:              JUL 13 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION: AIRPORT FENCE(04436-51240); 2.7KM & 080DGS/SRC

       TIME             H2S               THC            THC-CH4          CH4
                        NOX               NO2              NO            OZONE
                     SOLAR RAD           TEMP           HUMIDITY       BAROMETER
                     WIND SPEED   WIND DIRECTION

19:28----19:58        3.4E-03           2.5E+00          1.6E+00         6.5E-01
                      2.1E-02           1.3E-02          9.1E-03         3.8E-02
                      1.1E-02             27               59              986
                         8               300

19:38----20:08        1.0E-02           2.7E+00          1.7E+00         6.7E-01
                      2.2E-02           1.6E-02          8.4E-03         3.7E-02
                      1.0E-02             26               61              986
                         7               294

19:48----20:18        2.2E-02           2.9E+00          2.0E+00         6.9E-01
                      2.4E-02           1.9E-02          8.2E-03         3.6E-02
                      7.9E-03             25               63              986
                         7               291

19:58----20:28        3.4E-02           3.0E+00          2.0E+00         7.0E-01
                      2.5E-02           2.1E-02          8.4E-03         3.5E-02
                      5.8E-03             25               66              986
                         7               292

20:08----20:38        4.3E-02           3.1E+00          2.2E+00         7.2E-01
                      2.8E-02           2.5E-02          7.8E-03         3.3E-02
                      4.1E-03             24               70              986
                         7               295

20:18----20:48        4.2E-02           3.0E+00          2.0E+00         7.0E-01
                      2.6E-02           2.1E-02          8.8E-03         3.3E-02
                      2.9E-03             23               73              986
                         8               293

20:28----20:58        4.6E-02           2.9E+00          2.0E+00         7.0E-01
                      2.6E-02           2.0E-02          9.6E-03         3.1E-02
                      2.0E-03             23               77              986
                         8               294

20:38----21:08        5.1E-02           2.7E+00          1.8E+00         6.9E-01
                      2.3E-02           1.6E-02          9.9E-03         3.1E-02
                      1.3E-03             22               80              987
                         9               294

20:48----21:18        5.2E-02           3.2E+00          1.8E+00         6.8E-01
                      2.5E-02           1.8E-02          9.5E-03         3.0E-02
                      9.1E-04             22               83              987
                         9               296
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                              STATISTICS


UMBER OF READINGS 111

OLLUTANT              MINIMUM   MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                       VALUE     VALUE      MEAN     DEVIATION  MEAN     STD. DEV.

2S                    8.45E-04  7.85E-02  3.22E-02  2.19E-02  1.93E-02  3.68E+00
HC                    2.31E+00  1.21E+01  2.90E+00  1.12E+00  2.80E+00  1.25E+00
HC-CH4                1.40E+00  7.87E+00  1.86E+00  7.87E-01  1.78E+00  1.30E+00
H4                    6.14E-01  1.13E+00  6.83E-01  6.33E-02  6.81E-01  1.08E+00
OX                    1.03E-02  1.01E-01  2.43E-02  1.21E-02  2.24E-02  1.46E+00
O2                    1.00E-06  1.10E-01  1.85E-02  1.46E-02  1.11E-02  6.81E+00
O                     3.94E-03  4.32E-02  9.07E-03  5.11E-03  8.27E-03  1.47E+00
ZONE                  2.45E-02  3.86E-02  3.39E-02  3.30E-03  3.37E-02  1.11E+00
OLAR RAD              3.91E-04  1.38E-02  5.34E-03  4.35E-03  3.37E-03  2.91E+00
EMP                         21        27        24         2
UMIDITY                     56        86        70        10        70         1
AROMETER                   986       987       986         0       986         1
IND SPEED                    2        16         8         3         7         2
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                                        ESPANOLA #26


DATE:                JUL 14 1978
SCAN TIME:           60    SEC
AVERAGING TIME:  30     MIN
LOCATION: OLD WEBBWOOD RD(04385-51234); 2.3KM & 260DGS/SRC

        TIME              H2S              THC                SO2           THC-CH4
                          CH4              NOX                NO2             NO
                         OZONE          SOLAR RAD            TEMP          HUMIDITY
                       BAROMETER       WIND SPEED      WIND DIRECTION

11:21----11:51          2.2E-02          5.1E+00          1.7E-02          4.0E+00
                        1.2E+00          4.1E-02          1.6E-02          3.8E-02
                        1.9E-02          7.0E-02            25               57
                          993               3               86

11:31----12:01          1.9E-02          6.3E+00          2.0E-02          4.2E+00
                        1.1E+00          4.4E-02          2.0E-02          3.3E-02
                        1.9E-02          7.7E-02            28               49
                          993               3               96

11:41----12:11          1.9E-02          8.0E+00          2.4E-02          6.4E+00
                        1.2E+00          4.2E-02          1.4E-02          4.5E-02
                        1.9E-02          7.8E-02            30               45
                          993               3               95

11:51----12:21          2.1E-02          8.8E+00          2.8E-02          6.1E+00
                        1.2E+00          3.7E-02          1.7E-02          3.4E-02
                        2.0E-02          7.8E-02            32               43
                          993               3               99


                                 STATISTICS


NUMBER OF READINGS 61

POLLUTANT                MINIMUM    MAXIMUM   ARITHMETIC   STANDARD  GEOMETRIC  GEOMETRIC
                          VALUE      VALUE      MEAN      DEVIATION   MEAN      STD. DEV.

H2S                     1.35E-02   5.11E-02   2.14E-02   8.52E-03   2.01E-02   1.40E+00
THC                     2.91E+00   3.79E+01   6.93E+00   7.71E+00   5.04E+00   1.99E+00
SO2                     1.24E-02   3.34E-02   2.25E-02   6.21E-03   2.16E-02   1.33E+00
THC-CH4                 1.59E+00   3.15E+01   5.05E+00   6.13E+00   3.24E+00   2.32E+00
CH4                     1.06E+00   1.50E+00   1.16E+00   1.08E-01   1.15E+00   1.09E+00
NOX                     1.26E-02   1.37E-01   3.99E-02   2.68E-02   3.33E-02   1.81E+00
NO2                     1.00E-06   1.52E-01   1.77E-02   2.85E-02   1.02E-03   8.33E+01
NO                      6.59E-03   2.51E-01   3.59E-02   4.29E-02   2.39E-02   2.31E+00
OZONE                   1.41E-02   2.42E-02   1.97E-02   2.28E-03   1.96E-02   1.13E+00
SOLAR RAD               3.41E-02   8.32E-02   7.37E-02   1.17E-02   7.24E-02   1.23E+00
TEMP                        23         34         29          4
HUMIDITY                    38         68         50          9          49          1
BAROMETER                  992        993        993          0         993          1
WIND SPEED                   0          9          4          2           3          2
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                                ESPANOLA #27


DATE:              JUL 14 1978
SCAN TIME:         60    SEC
AVERAGING TIME:  30    MIN
LOCATION: OLD WEBBWOOD RD & HWY #68(04399-51242); 1.2KM & 300DGS/SRC

      TIME            H2S            THC             SO2           THC-CH4
                      CH4            NOX             NO2             NO
                     OZONE        SOLAR RAD          TEMP          HUMIDITY
                   BAROMETER      WIND SPEED   WIND DIRECTION

13:02----13:32      2.1E-02        6.8E+00         3.8E-02         4.2E+00
                    1.2E+00        7.6E-02         3.7E-02         4.7E-02
                    2.3E-02        8.6E-02           30              43
                      991             3             159

13:12----13:42      1.5E-02        4.7E+00         3.2E-02         2.9E+00
                    1.2E+00        5.2E-02         2.2E-02         3.1E-02
                    2.4E-02        8.4E-02           30              44
                      991             4             167

13:22----13:52      1.3E-02        4.9E+00         3.0E-02         3.3E+00
                    1.2E+00        4.4E-02         1.4E-02         4.0E-02
                    2.4E-02        7.4E-02           30              43
                      990             4             180


                          STATISTICS


NUMBER OF READING: 53

POLLUTANT             MINIMUM    MAXIMUM   ARITHMETIC  STANDARD  GEOMETRIC  GEOMETRIC
                       VALUE      VALUE       MEAN     DEVIATION   MEAN     STD. DEV:

H2S                   1.12E-02   4.82E-02   1.75E-02   8.66E-03   1.61E-02   1.45E+00
THC                   2.85E+00   3.09E+01   5.95E+00   4.81E+00   4.90E+00   1.78E+00
SO2                   2.27E-02   6.13E-02   3.36E-02   8.58E-03   3.27E-02   1.[illegible]5E+00
THC-CH4               1.52E+00   2.03E+01   3.85E+00   3.99E+00   2.84E+00   2.01E+00
CH4                   1.10E+00   1.94E+00   1.22E+00   1.68E-01   1.21E+00   1.13E+00
NOX                   1.86E-02   3.75E-01   6.20E-02   6.76E-02   4.67E-02   1.95E+00
NO2                   1.00E-06   3.60E-01   2.81E-02   5.36E-02   1.42E-03   9.07E+01
NO                    1.32E-02   2.11E-01   4.29E-02   4.15E-02   3.17E-02   2.06E+00
OZONE                 1.16E-02   2.74E-02   2.37E-02   2.58E-03   2.36E-02   1.14E+00
SOLAR RAD             2.27E-02   1.04E-01   7.77E-02   2.29E-02   7.27E-02   1.51E+00
TEMP                     27         32         30          1
HUMIDITY                 39         52         44          3          43          1
BAROMETER               990        991        991          0         991          1
WIND SPEED                0         14          4          3           2          1
```

```
                                   ESPANOLA #28

DATE:            JUL 14 1978
SCAN TIME:       60    SEC
AVERAGING TIME:  30    MIN
LOCATION:
OLD NAIRN RD, 0.5KM E OF RAIL TRACKS(04410-51245); 0.8KM & 026DGS/SRC

       TIME          H2S            THC            SO2          THC-CH4
                     CH4            NOX            NO2           NO
                  OZONE          SOLAR RAD        TEMP         HUMIDITY
                  BAROMETER     WIND SPEED   WIND DIRECTION

14:44----15:14      2.0E-02        5.7E+00        8.7E-02        3.6E+00
                    1.2E+00        5.9E-02        3.8E-02        3.2E-02
                    2.2E-02        3.9E-02           29             53
                      991              2            284

14:59----15:29      1.2E-02        7.9E+00        6.4E-02        4.5E+00
                    1.1E+00        4.3E-02        2.4E-02        3.3E-02
                    2.4E-02        3.3E-02           29             51
                      991              2            280

15:14----15:44      1.5E-02        1.4E+01        4.0E-02        8.5E+00
                    1.2E+00        5.3E-02        2.2E-02        4.3E-02
                    2.1E-02        2.5E-02           27             58
                      991              1            284

15:29----15:59      1.5E-02        1.6E+01        2.9E-02        1.1E+01
                    1.3E+00        5.8E-02        2.4E-02        4.0E-02
                    2.1E-02        2.7E-02           27             58
                      991              1            281

15:44----16:14      1.1E-02        1.2E+01        1.9E-02        8.3E+00
                    1.2E+00        4.9E-02        2.3E-02        3.0E-02
                    2.3E-02        4.4E-02           28             55
                      990              3            285

15:59----16:29      9.5E-03        6.2E+00        8.3E-03        4.1E+00
                    1.2E+00        3.4E-02        1.4E-02        2.3E-02
                    2.4E-02        5.2E-02           29             52
                      990              5            287
```

```
                               STATISTICS

NUMBER OF READINGS 108

POLLUTANT             MINIMUM   MAXIMUM  ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                       VALUE     VALUE      MEAN    DEVIATION  MEAN     STD. DEV.

H2S                   8.12E-03  5.76E-02  1.42E-02  8.30E-03  1.29E-02  1.49E+00
THC                   2.76E+00  4.90E+01  9.99E+00  1.15E+01  6.33E+00  2.41E+00
SO2                   1.00E-06  9.84E-02  4.11E-02  3.20E-02  1.94E-02  8.80E+00
THC-CH4               1.47E+00  3.46E+01  6.34E+00  7.60E+00  3.75E+00  2.61E+00
CH4                   1.04E+00  2.00E+00  1.20E+00  1.90E-01  1.19E+00  1.15E+00
NOX                   1.44E-02  1.93E-01  5.01E-02  3.87E-02  3.97E-02  1.93E+00
NO2                   1.00E-06  1.80E-01  2.61E-02  3.51E-02  3.08E-03  4.92E+01
NO                    7.09E-03  2.00E-01  3.29E-02  3.03E-02  2.53E-02  1.97E+00
OZONE                 1.42E-02  2.68E-02  2.25E-02  3.26E-03  2.23E-02  1.17E+00
SOLAR RAD             1.79E-02  8.63E-02  3.66E-02  1.91E-02  3.28E-02  1.56E+00
TEMP                        25        33        28         2                   -
HUMIDITY                    39       135        55        11        54         1
BAROMETER                  990       991       991         0       991         1
WIND SPEED                   0        12         3         3         1         7
```

```
                                ESPANOLA #29

DATE:             JUL 14 1978
SCAN TIME:        60    SEC
AVERAGING TIME:   30    MIN
LOCATION: MTC DEPOT ON HWY #17(04431-51261); 3.3KM & 040DGS/SEC

      TIME              H2S           THC            SO2           THC-CH4
                        CH4           NOX            NO2             NO
                       OZONE       SOLAR RAD        TEMP          HUMIDITY
                     BAROMETER    WIND SPEED   WIND DIRECTION

 16:59----17:29       9.6E-03       3.4E+00       5.1E-04        1.7E+00
                      1.2E+00       8.4E-02       2.9E-02        5.2E-02
                      2.0E-02       4.8E-02         30             50
                        990            8            261

 17:14----17:44       8.3E-03       3.4E+00       3.0E-05        1.7E+00
                      1.2E+00       6.0E-02       1.6E-02        4.9E-02
                      2.2E-02       4.5E-02         31             49
                        989            8            244

 17:29----17:59       6.8E-03       3.1E+00       1.0E-06        1.7E+00
                      1.2E+00       6.3E-02       2.1E-02        4.6E-02
                      2.2E-02       5.4E-02         33             48
                        989            9            241

 17:44----18:14       5.9E-03       2.9E+00       1.0E-06        1.5E+00
                      1.2E+00       6.4E-02       2.3E-02        4.9E-02
                      2.1E-02       5.2E-02         33             48
                        989            9            248

 17:59----18:29       5.3E-03       3.0E+00       1.0E-06        1.5E+00
                      1.3E+00       5.8E-02       2.1E-02        4.8E-02
                      2.2E-02       4.5E-02         32             49
                        989           10            251

 18:14----18:44       4.8E-03       2.9E+00       1.0E-06        1.5E+00
                      1.3E+00       6.3E-02       2.9E-02        4.2E-02
                      2.1E-02       4.1E-02         32             51
                        989            9            262

 18:29----18:59       4.2E-03       2.8E+00       1.0E-06        1.4E+00
                      1.3E+00       6.6E-02       2.8E-02        4.1E-02
                      2.0E-02       3.9E-02         31             52
                        989            8            269

 18:44----19:14       3.8E-03       2.9E+00       1.0E-06        1.5E+00
                      1.3E+00       6.4E-02       2.0E-02        4.9E-02
                      2.1E-02       3.5E-02         32             52
                        989            7            257

 18:59----19:29       3.9E-03       3.3E+00       1.0E-06        1.6E+00
                      1.3E+00       6.5E-02       2.1E-02        5.0E-02
                      2.1E-02       2.9E-02         31             54
                        989            6            243

 19:14----19:44       3.7E-03       3.5E+00       1.0E-06        1.6E+00
                      1.3E+00       6.1E-02       2.1E-02        4.6E-02
                      2.1E-02       2.3E-02         29             58
                        988            6            239
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        TIME         H2S             THC             SO2          THC-CH4
                     CH4             NOX             NO2            NO
                    OZONE         SOLAR RAD         TEMP         HUMIDITY
                   BAROMETER     WIND SPEED   WIND DIRECTION

19:29----19:59       3.6E-03        3.5E+00         1.0E-06        1.8E+00
                     1.3E+00        7.3E-02         2.7E-02        5.1E-02
                     2.0E-02        1.8E-02           27             62
                       988             5             235

19:44----20:14       3.7E-03        4.8E+00         2.2E-05        2.4E+00
                     1.3E+00        1.0E-01         4.0E-02        7.8E-02
                     1.7E-02        1.0E-02           25             68
                       988             4             225


                              STATISTICS


NUMBER OF READINGS 197

POLLUTANT             MINIMUM   MAXIMUM  ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                       VALUE     VALUE     MEAN     DEVIATION  MEAN      STD. DEV.

H2S                    2.86E-03  1.45E-02  5.39E-03  2.25E-03  5.02E-03  1.43E+00
THC                    2.72E+00  1.31E+01  3.40E+00  1.58E+00  3.21E+00  1.34E+00
SO2                    1.00E-06  1.84E-03  8.11E-05  3.08E-04  1.72E-06  6.33E+00
THC-CH4                1.35E+00  8.96E+00  1.73E+00  8.85E-01  1.63E+00  1.35E+00
CH4                    1.17E+00  1.72E+00  1.26E+00  6.15E-02  1.26E+00  1.05E+00
NOX                    2.19E-02  2.45E-01  7.30E-02  4.20E-02  6.38E-02  1.66E+00
NO2                    1.00E-06  1.63E-01  2.66E-02  3.36E-02  1.16E-03  1.08E+02
NO                     1.51E-02  2.45E-01  5.36E-02  3.19E-02  4.63E-02  1.70E+00
OZONE                  8.87E-03  2.60E-02  2.02E-02  3.31E-03  1.99E-02  1.20E+00
SOLAR RAD              4.02E-03  7.39E-02  3.60E-02  1.78E-02  2.95E-02  2.11E+00
TEMP                       23        35        30         3
HUMIDITY                   42        80        54         8        54         1
BAROMETER                 988       990       989         0       989         1
WIND SPEED                  1        16         8         3         7         2
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                                   ESPANOLA #30

DATE:               JUL 14 1978
SCAN TIME:          60     SEC
AVERAGING TIME:     30     MIN
LOCATION: SPRING ON OLD NAIRN RD(04408-51246); 0.8KM & 010DGS SRC

      TIME             H2S           THC           THC-CH4          CH4
                       NOX           NO2           NO               OZONE
                    SOLAR RAD        TEMP          BAROMETER        WIND SPEED
                 WIND DIRECTION

21:07----21:37       2.0E-03       8.8E+00       6.4E+00          1.6E+00
                     1.0E-01       3.9E-02       7.9E-02          7.3E-03
                     6.4E-05         18            988               0
                       97

21:22----21:52       1.6E-03       8.6E+00       5.7E+00          1.5E+00
                     1.0E-01       4.0E-02       7.8E-02          9.3E-03
                     1.9E-05         18            988               0
                       91

21:37----22:07       1.4E-03       8.8E+00       6.1E+00          1.6E+00
                     8.9E-02       3.1E-02       6.9E-02          1.1E-02
                     2.1E-06         18            988               0
                       111

21:52----22:22       1.5E-03       1.2E+01       8.1E+00          1.7E+00
                     9.9E-02       3.5E-02       7.2E-02          9.0E-03
                     3.5E-06         17            988               0
                       149

22:07----22:37       1.6E-03       1.2E+01       8.4E+00          1.6E+00
                     1.1E-01       4.2E-02       7.9E-02          7.4E-03
                     4.1E-06         17            989               0
                       152

22:22----22:52       2.1E-03       1.1E+01       7.8E+00          1.6E+00
                     1.2E-01       4.0E-02       9.0E-02          7.4E-03
                     9.2E-06         17            989               0
                       338

22:37----23:07       3.5E-03       1.2E+01       8.1E+00          1.6E+00
                     1.1E-01       3.8E-02       9.8E-02          6.7E-03
                     1.0E-05         17            989               0
                       324

22:52----23:22       5.1E-03       1.1E+01       8.9E+00          1.7E+00
                     1.1E-01       4.2E-02       8.7E-02          6.1E-03
                     2.6E-06         17            989               0
                       111

23:07----23:37       6.1E-03       1.3E+01       1.0E+01          1.7E+00
                     1.2E-01       4.5E-02       8.7E-02          4.9E-03
                     1.1E-06         17            988               0
                       111

23:22----23:52       6.0E-03       1.3E+01       8.8E+00          1.6E+00
                     1.1E-01       4.3E-02       7.9E-02          5.2E-03
                     1.3E-06         17            988               0
                       201
      TIME              H2S              THC            THC-CH4            CH4
                        NOX              NO2              NO              OZONE
                     SOLAR RAD           TEMP         BAROMETER        WIND SPEED
                  WIND DIRECTION

23:37----00:07        5.3E-03          1.1E+01         6.5E+00          1.5E+00
                      1.2E-01          5.8E-02         7.0E-02          6.1E-03
                      4.0E-06            16              988               0
                        204

23:52----00:22        5.0E-03          1.0E+01         6.6E+00          1.5E+00
                      1.3E-01          5.9E-02         7.6E-02          5.3E-03
                      3.9E-06            16              988               0
                        198

00:07----00:37        4.4E-03          9.7E+00         6.1E+00          1.5E+00
                      1.3E-01          5.3E-02         8.2E-02          4.7E-03
                      1.1E-06            16              988               0
                        237

00:22----00:52        3.2E-03          1.2E+01         8.5E+00          1.7E+00
                      1.4E-01          5.4E-02         1.0E-01          3.3E-03
                      1.2E-06            15              988               0
                         82

00:37----01:07        2.1E-03          1.2E+01         8.5E+00          1.7E+00
                      1.4E-01          4.4E-02         1.1E-01          3.1E-03
                      2.1E-06            15              988               0
                        259

00:52----01:22        1.3E-03          8.8E+00         5.7E+00          1.5E+00
                      1.1E-01          3.1E-02         9.8E-02          4.1E-03
                      3.5E-06            14              987               0
                        254

01:07----01:37        7.2E-04          9.0E+00         5.9E+00          1.5E+00
                      1.1E-01          3.6E-02         8.7E-02          4.5E-03
                      6.5E-06            14              987               0
                        247

01:22----01:52        4.1E-04          1.2E+01         7.0E+00          1.5E+00
                      1.4E-01          5.1E-02         9.0E-02          3.9E-03
                      9.2E-06            14              987               0
                        255

01:37----02:07        2.7E-04          1.3E+01         7.5E+00          1.5E+00
                      1.1E-01          3.6E-02         8.9E-02          3.5E-03
                      1.6E-05            14              987               0
                        273

01:52----02:22        1.7E-04          1.3E+01         8.2E+00          1.5E+00
                      8.0E-02          2.1E-02         6.8E-02          2.9E-03
                      2.1E-05            15              987               0
                        359

02:07----02:37        1.5E-04          1.3E+01         8.0E+00          1.5E+00
                      9.9E-02          3.0E-02         7.6E-02          1.3E-03
                      1.7E-05            15              987               0
                         63
      TIME             H2S              THC              THC-CH4           CH4
                       NOX              NO2              NO                OZONE
                    SOLAR RAD           TEMP             BAROMETER         WIND SPEED
                  WIND DIRECTION

02:22----02:52      1.3E-04          1.1E+01          7.3E+00          1.6E+00
                    1.4E-01          3.6E-02          1.2E-01          9.3E-04
                    1.3E-05            15               987               0
                      101

02:37----03:07      9.3E-05          9.1E+00          6.1E+00          1.5E+00
                    1.1E-01          2.2E-02          1.1E-01          1.3E-03
                    1.0E-05            15               987               0
                      67

02:52----03:22      4.2E-05          1.1E+01          7.8E+00          1.6E+00
                    8.1E-02          1.9E-02          7.9E-02          1.7E-03
                    1.0E-05            15               987               0
                      40

03:07----03:37      5.7E-06          1.2E+01          7.5E+00          1.6E+00
                    1.0E-01          3.4E-02          8.3E-02          2.4E-03
                    1.3E-05            15               987               0
                      291

03:22----03:52      1.0E-06          8.5E+00          4.6E+00          1.4E+00
                    1.2E-01          4.1E-02          8.3E-02          3.1E-03
                    1.3E-05            15               987               0
                      63

03:37----04:07      1.0E-06          7.0E+00          4.3E+00          1.4E+00
                    1.1E-01          2.9E-02          8.8E-02          5.2E-03
                    1.3E-05            15               987               0
                      60

03:52----04:22      2.5E-05          1.1E+01          6.1E+00          1.5E+00
                    8.8E-02          2.2E-02          8.0E-02          6.6E-03
                    1.5E-05            16               987               0
                      57

04:07----04:37      2.5E-05          1.4E+01          7.6E+00          1.6E+00
                    1.2E-01          2.5E-02          1.2E-01          4.7E-03
                    1.1E-05            16               986               0
                      66

04:22----04:52      3.7E-05          1.2E+01          7.9E+00          1.6E+00
                    1.3E-01          2.5E-02          1.4E-01          3.4E-03
                    9.0E-06            16               986               0
                      75

04:37----05:07      3.7E-05          1.1E+01          8.2E+00          1.7E+00
                    1.3E-01          3.2E-02          1.1E-01          2.9E-03
                    1.2E-05            16               986               0
                      121

04:52----05:22      1.0E-06          9.0E+00          6.0E+00          1.5E+00
                    1.3E-01          3.1E-02          1.2E-01          3.1E-03
                    1.3E-05            15               986               0
                      80
      TIME               H2S              THC            THC-CH4           CH4
                         NOX              NO2              NO             OZONE
                      SOLAR RAD          TEMP           BAROMETER       WIND SPEED
                   WIND DIRECTION

05:07----05:37        1.3E-05          9.1E+00          5.9E+00          1.5E+00
                      9.4E-02          1.3E-02          9.5E-02          4.0E-03
                      1.5E-05            15               986               0
                        66

05:22----05:52        1.3E-05          1.3E+01          9.6E+00          1.7E+00
                      1.3E-01          2.5E-02          1.3E-01          2.0E-03
                      4.1E-05            15               986               0
                        35

05:37----06:07        3.4E-05          1.9E+01          1.2E+01          2.0E+00
                      1.6E-01          2.8E-02          1.5E-01          2.2E-03
                      1.4E-04            16               985               0
                        181

05:52----06:22        3.4E-05          1.4E+01          8.6E+00          1.8E+00
                      1.0E-01          1.5E-02          8.9E-02          3.3E-03
                      4.2E-04            15               985               0
                        173

06:07----06:37        1.0E-06          9.1E+00          6.0E+00          1.5E+00
                      8.0E-02          2.2E-02          6.7E-02          3.8E-03
                      6.6E-04            15               985               0
                        244

06:22----06:52        1.0E-06          1.2E+01          7.5E+00          1.6E+00
                      1.1E-01          2.6E-02          1.1E-01          2.6E-03
                      1.0E-03            15               985               0
                        61

06:37----07:07        3.5E-06          1.1E+01          7.2E+00          1.6E+00
                      1.5E-01          3.8E-02          1.5E-01          1.6E-03
                      3.3E-03            15               985               0
                        153

06:52----07:22        3.5E-06          1.1E+01          7.0E+00          1.6E+00
                      1.5E-01          4.8E-02          1.2E-01          1.3E-03
                      4.7E-03            15               985               0
                        158

07:07----07:37        2.5E-05          1.2E+01          6.9E+00          1.6E+00
                      1.2E-01          5.3E-02          7.8E-02          1.7E-03
                      5.0E-03            16               985               0
                        47

07:22----07:52        1.6E-04          1.1E+01          6.2E+00          1.5E+00
                      1.0E-01          4.1E-02          7.3E-02          4.1E-03
                      8.4E-03            17               985               0
                        44

07:37----08:07        5.7E-04          1.3E+01          7.7E+00          1.6E+00
                      1.4E-01          3.2E-02          1.2E-01          6.6E-03
                      1.0E-02            18               985               0
                        48
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          ME              H2S             THC           THC-CH4           CH4
                          NOX             NO2             NO             OZONE
                       SOLAR RAD          TEMP         BAROMETER      WIND SPEED
                    WIND DIRECTION

07:52----08:22          6.3E-04         1.3E+01         8.3E+00         1.7E+00
                        1.6E-01         4.6E-02         1.3E-01         8.5E-03
                        9.8E-03            19             985              0
                          46

08:07----08:37          2.0E-03         1.2E+01         6.8E+00         1.6E+00
                        1.2E-01         4.9E-02         9.4E-02         1.1E-02
                        9.7E-03            19             985              0
                          25

08:22----08:52          4.9E-03         1.1E+01         6.4E+00         1.6E+00
                        1.6E-01         7.5E-02         1.1E-01         1.4E-02
                        1.1E-02            20             985              0
                          264

08:37----09:07          4.0E-03         9.5E+00         5.8E+00         1.5E+00
                        1.4E-01         6.5E-02         1.0E-01         1.8E-02
                        1.0E-02            21             985              1
                          247

08:52----09:22          1.7E-03         9.0E+00         5.0E+00         1.4E+00
                        9.5E-02         2.2E-02         1.0E-01         2.1E-02
                        1.3E-02            21             985              1
                          241


                                  STATISTICS


NUMBER OF READINGS 735

POLLUTANT                MINIMUM   MAXIMUM  ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                          VALUE     VALUE      MEAN    DEVIATION   MEAN    STD. DEV.

H2S                     1.00E-06  1.57E-02  1.43E-03  2.11E-03  6.64E-05  4.12E+01
THC                     2.80E+00  3.84E+01  1.11E+01  7.44E+00  9.01E+00  1.92E+00
THC-CH4                 1.43E+00  3.38E+01  7.20E+00  5.36E+00  5.59E+00  2.05E+00
CH4                     1.17E+00  3.77E+00  1.58E+00  3.71E-01  1.55E+00  1.23E+00
NOX                     2.89E-02  5.62E-01  1.18E-01  8.08E-02  9.77E-02  1.82E+00
NO2                     1.00E-06  4.71E-01  3.69E-02  5.57E-02  7.92E-04  1.63E+02
NO                      1.72E-02  4.90E-01  9.63E-02  7.02E-02  7.68E-02  1.95E+00
OZONE                   2.49E-04  2.85E-02  5.60E-03  5.04E-03  3.89E-03  2.43E+00
SOLAR RAD               1.00E-06  2.55E-02  1.96E-03  4.12E-03  3.85E-05  2.49E+01
TEMP                          14        23        16         2
BAROMETER                    985       989       987         1       987         1
WIND SPEED                     0         5         0         0         0         5
```

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                              ESPANOLA #31


DATE:             JUL 15 1978
SCAN TIME:        60    SEC
AVERAGING TIME:   30    MIN
LOCATION: SECOND ST., 1.0KM E. #99(04424-51227); 2.0KM & 135DGS/SRC

      TIME            H2S            THC          THC-CH4         CH4
                      NOX            NO2            NO           OZONE
                   SOLAR RAD         TEMP        HUMIDITY      BAROMETER
                  WIND SPEED   WIND DIRECTION

13:24----13:54      1.2E-02        1.4E+01        8.2E+00       1.6E+00
                    1.2E-01        5.1E-02        7.9E-02       2.2E-02
                    2.7E-02          25             81            985
                       1            318

13:34----14:04      1.2E-02        1.4E+01        8.5E+00       1.6E+00
                    1.2E-01        5.4E-02        8.7E-02       2.1E-02
                    3.0E-02          26             77            985
                       1            315

13:44----14:14      1.2E-02        1.4E+01        9.2E+00       1.7E+00
                    1.2E-01        6.2E-02        8.6E-02       2.1E-02
                    4.4E-02          27             73            985
                       1            316

13:54----14:24      9.4E-03        1.0E+01        7.9E+00       1.6E+00
                    1.1E-01        7.4E-02        6.0E-02       2.2E-02
                    5.2E-02          28             68            985
                       1            344

14:04----14:34      8.5E-03        9.9E+00        7.7E+00       1.5E+00
                    1.0E-01        7.0E-02        5.4E-02       2.2E-02
                    5.9E-02          28             65            985
                       1             24

14:14----14:44      9.2E-03        9.3E+00        7.3E+00       1.5E+00
                      1.0E-01        6.4E-02        4.6E-02       2.3E-02
                    4.9E-02          29             62            985
                       1            282
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                                 STATISTICS


NUMBER OF READINGS 89

POLLUTANT              MINIMUM    MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                       VALUE      VALUE      MEAN      DEVIATION  MEAN      STD. DEV.

H2S                   7.42E-03  2.37E-02  1.10E-02  3.86E-03  1.05E-02  1.35E+00
THC                   3.29E+00  4.05E+01  1.23E+01  7.96E+00  9.98E+00  1.94E+00
THC-CH4               1.78E+00  2.51E+01  8.43E+00  6.27E+00  6.27E+00  2.21E+00
CH4                   1.19E+00  2.61E+00  1.58E+00  3.84E-01  1.54E+00  1.26E+00
NOX                   1.84E-02  2.92E-01  1.11E-01  6.43E-02  9.37E-02  1.82E+00
NO2                   1.00E-06  2.47E-01  5.82E-02  6.29E-02  2.71E-03  1.39E+03
NO                    1.49E-02  1.81E-01  7.03E-02  4.39E-02  5.67E-02  1.90E+00
OZONE                 1.25E-02  2.74E-02  2.16E-02  3.79E-03  2.12E-02  1.21E+00
SOLAR RAD             1.46E-02  1.06E-01  3.81E-02  2.47E-02  3.25E-02  1.72E+00
TEMP                        24        30        27         2
HUMIDITY                    56        91        70        10        70         1
BAROMETER                  985       985       985         0       985         1
WIND SPEED                   0         9         2         2         1        11
```

```
                         ESPANOLA #33

DATE:              JUL 15 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION:
OLD NAIRN RD, 1 KM E OF RAIL TRACKS(04415-51244); 1 KM & 040DGS/SRC

        TIME          H2S            THC          THC-CH4         CH4
                      NOX            NO2            NO           OZONE
                   SOLAR RAD        TEMP         HUMIDITY      BAROMETER
                  WIND SPEED   WIND DIRECTION

16:15----16:45      3.6E-02        5.4E+00        3.5E+00        1.3E+00
                    3.3E-02        1.2E-02        2.6E-02        2.3E-02
                    6.4E-02          33             64             984
                       4            255

16:30----17:00      2.7E-02        5.8E+00        4.1E+00        1.4E+00
                    5.4E-02        2.6E-02        3.2E-02        2.2E-02
                    6.4E-02          34             60             984
                       4            250

16:45----17:15      2.0E-02        5.9E+00        3.2E+00        1.3E+00
                    5.1E-02        2.5E-02        2.9E-02        2.2E-02
                    6.0E-02          34             61             984
                       3            260

17:00----17:30      3.8E-02        5.6E+00        2.8E+00        1.3E+00
                    6.0E-02        3.8E-02        2.7E-02        2.2E-02
                    5.6E-02          33             64             984
                       4            257

17:15----17:45      4.5E-02        6.0E+00        3.0E+00        1.3E+00
                    6.8E-02        4.2E-02        3.6E-02        2.2E-02
                    5.3E-02          32             65             984
                       4            249

17:30----18:00      2.7E-02        6.0E+00        3.4E+00        1.2E+00
                    4.2E-02        1.7E-02        3.1E-02        2.3E-02
                    4.9E-02          30             68             984
                       3            248

17:45----18:15      1.7E-02        5.9E+00        3.0E+00        1.2E+00
                    3.5E-02        1.8E-02        2.1E-02        2.4E-02
                    4.7E-02          27             70             984
                       4            257

18:00----18:30      1.5E-02        5.4E+00        2.8E+00        1.1E+00
                    3.3E-02        2.0E-02        1.8E-02        2.4E-02
                    4.0E-02          26             72             985
                       5            258

18:15----18:45      1.2E-02        7.5E+00        3.3E+00        1.1E+00
                    3.9E-02        2.0E-02        2.5E-02        2.3E-02
                    3.3E-02          25             74             985
                       4            261

18:30----19:00      1.0E-02        7.6E+00        3.4E+00        1.1E+00
                    4.5E-02        2.0E-02        3.1E-02        2.2E-02
                    2.0E-02          24             78             985
                       3            266
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      TIME            H2S            THC            THC-CH4           CH4
                      NOX            NO2              NO             OZONE
                   SOLAR RAD         TEMP          HUMIDITY        BAROMETER
                  WIND SPEED    WIND DIRECTION



                              STATISTICS


NUMBER OF READINGS 178

POLLUTANT              MINIMUM    MAXIMUM   ARITHMETIC  STANDARD GEOMETRIC GEOMETRIC
                        VALUE      VALUE       MEAN     DEVIATION  MEAN     STD. DEV.

H2S                   8.05E-03  1.65E-01  2.32E-02  2.41E-02  1.77E-02  1.91E+00
THC                   3.06E+00  2.61E+01  6.05E+00  4.51E+00  5.06E+00  1.72E+00
THC-CH4               1.62E+00  1.53E+01  3.27E+00  2.25E+00  2.31E+00  1.65E+00
CH4                   1.01E+00  1.77E+00  1.23E+00  1.53E-01  1.23E+00  1.13E+00
NOX                   1.26E-02  1.94E-01  4.40E-02  2.89E-02  3.69E-02  1.79E+00
NO2                   1.00E-06  1.94E-01  2.22E-02  3.03E-02  1.29E-03  8.69E+01
NO                    7.41E-03  1.28E-01  2.75E-02  1.95E-02  2.28E-02  1.80E+00
OZONE                 1.29E-02  2.67E-02  2.27E-02  2.51E-03  2.26E-02  1.13E+00
SOLAR RAD             2.29E-03  6.95E-02  4.42E-02  2.03E-02  3.47E-02  2.44E+00
TEMP                        22        36        29         4
HUMIDITY                    55        91        70         8        69         1
BAROMETER                  984       985       984         0       984         1
WIND SPEED                   0        13         4         2         3 [illegible]
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                                    ESPANOLA #35

DATE:             JUL 15 1978
SCAN TIME:        60    SEC
AVERAGING TIME:   30    MIN
LOCATION: STATION RD, AT BEAVER LUMBER(04409-51232); 0.8KM & 170DGS/SRC

       TIME           H2S            THC           THC-CH4          CH4
                      NOX            NO2            NO             OZONE
                   SOLAR RAD        TEMP         HUMIDITY        BAROMETER
                  WIND SPEED   WIND DIRECTION

20:11----20:41       9.6E-02        3.5E+00        2.0E+00         1.0E+00
                     2.9E-02        1.7E-02        1.5E-02         1.1E-02
                     4.3E-03           21             83             986
                        15              4

20:16----20:46       1.0E-01        3.5E+00        2.1E+00         1.0E+00
                     3.1E-02        1.8E-02        1.7E-02         1.1E-02
                     4.0E-03           21             83             987
                        15              3

20:21----20:51       1.1E-01        3.6E+00        2.1E+00         1.0E+00
                     3.4E-02        1.9E-02        1.8E-02         1.1E-02
                     3.6E-03           21             83             987
                        14              0

20:26----20:56       1.0E-01        3.6E+00        2.1E+00         1.0E+00
                     3.2E-02        1.8E-02        1.7E-02         1.1E-02
                     3.0E-03           21             83             987
                        13            359

20:31----21:01       1.0E-01        3.6E+00        2.1E+00         1.0E+00
                     3.3E-02        1.7E-02        1.9E-02         1.1E-02
                     2.4E-03           21             83             987
                        14            356

20:36----21:06       9.9E-02        3.5E+00        2.1E+00         9.9E-01
                     3.1E-02        1.5E-02        2.0E-02         1.1E-02
                     2.0E-03           21             84             987
                        14            355

20:41----21:11       1.0E-01        3.6E+00        2.1E+00         9.8E-01
                     2.8E-02        1.3E-02        1.7E-02         1.1E-02
                     1.5E-03           20             84             987
                        12            351

20:46----21:16       1.1E-01        3.7E+00        2.1E+00         9.7E-01
                     3.0E-02        1.5E-02        1.6E-02         1.1E-02
                     1.1E-03           20             85             987
                        12            350

20:51----21:21       1.1E-01        3.6E+00        2.1E+00         9.7E-01
                     3.0E-02        1.5E-02        1.7E-02         1.1E-02
                     7.9E-04           20             85             987
                        12            351

20:56----21:26       1.2E-01        3.7E+00        2.2E+00         9.7E-01
                     3.3E-02        1.9E-02        1.8E-02         9.7E-03
                     5.3E-04           20             86             987
                        12            355
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        TIME               H2S              THC             THC-CH4          CH4
                           NOX              NO2               NO            OZONE
                        SOLAR RAD           TEMP           HUMIDITY       BAROMETER
                       WIND SPEED    WIND DIRECTION

 21:01----21:31          1.2E-01          3.7E+00          2.2E+00          9.6E-01
                         3.5E-02          2.0E-02          1.8E-02          9.1E-03
                         3.8E-04            20               86               987
                           11                0

 21:06----21:36          1.1E-01          3.6E+00          2.1E+00          9.4E-01
                         3.3E-02          1.8E-02          1.7E-02          9.4E-03
                         3.0E-04            20               87               987
                           11                2

 21:11----21:41          9.7E-02          3.6E+00          2.1E+00          9.2E-01
                         3.0E-02          1.7E-02          1.7E-02          9.6E-03
                         2.3E-04            19               87               987
                           11                5

 21:16----21:46          9.6E-02          3.5E+00          2.1E+00          9.0E-01
                         3.1E-02          1.5E-02          1.8E-02          9.4E-03
                         1.2E-04            19               87               987
                           11                5

 21:21----21:51          9.4E-02          3.5E+00          2.1E+00          8.9E-01
                         2.9E-02          1.4E-02          1.7E-02          9.6E-03
                         5.7E-05            19               88               987
                           12                8

 21:26----21:56          8.7E-02          3.4E+00          2.1E+00          8.8E-01
                         2.6E-02          1.2E-02          1.6E-02          1.0E-02
                         2.7E-05            19               88               987
                           11                9

 21:31----22:01          8.1E-02          3.5E+00          2.1E+00          8.7E-01
                         2.4E-02          1.1E-02          1.5E-02          1.0E-02
                         1.0E-05            19               88               988
                           11                9

 21:36----22:06          8.1E-02          3.5E+00          2.1E+00          8.8E-01
                         2.5E-02          1.1E-02          1.6E-02          1.0E-02
                         3.0E-06            18               89               988
                           10               11

 21:41----22:11          8.0E-02          3.5E+00          2.1E+00          8.7E-01
                         2.6E-02          1.1E-02          1.4E-02          1.1E-02
                         1.3E-06            18               89               988
                           10               12
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STATISTICS

NUMBER OF READINGS 124

POLLUTANT	MINIMUM VALUE	MAXIMUM VALUE	ARITHMETIC MEAN	STANDARD DEVIATION	GEOMETRIC MEAN	GEOMETRIC STD. DEV.
H2S	3.40E-02	2.46E-01	9.22E-02	4.50E-02	8.26E-02	1.60E+00
THC	3.06E+00	5.30E+00	3.53E+00	4.01E-01	3.51E+00	1.11E+00
THC-CH4	1.75E+00	3.16E+00	2.08E+00	2.49E-01	2.07E+00	1.12E+00
CH4	8.08E-01	1.29E+00	9.47E-01	9.55E-02	9.42E-01	1.10E+00
NOX	9.31E-03	9.86E-02	2.78E-02	1.56E-02	2.43E-02	1.67E+00
NO2	1.00E-06	8.16E-02	1.42E-02	1.34E-02	4.79E-03	1.64E+01
NO	3.97E-03	6.08E-02	1.54E-02	1.05E-02	1.27E-02	1.83E+00
OZONE	4.00E-03	1.57E-02	1.08E-02	2.53E-03	1.05E-02	1.31E+00
SOLAR RAD	1.00E-06	6.06E-03	1.46E-03	1.83E-03	1.35E-04	2.76E+01
TEMP	18	21	20	1		
HUMIDITY	82	91	86	3	86	1
BAROMETER	986	988	987	0	987	1
WIND SPEED	4	25	12	4	11	1

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                                   ESPANOLA #36


DATE:              JUL 15 1978
SCAN TIME:         60    SEC
AVERAGING TIME:    30    MIN
LOCATION:
SCHOOL AT MEAD & SCOLLARD STS.(04404-51228); 1.1KM & 210DGS/SPC

      TIME           H2S              THC            THC-CH4           CH4
                     NOX              NO2              NO             OZONE
                  SOLAR RAD          TEMP           HUMIDITY        BAROMETER
                  WIND SPEED    WIND DIRECTION

22:33----23:03     2.0E-02         3.3E+00          2.3E+00          8.4E-01
                   4.2E-02         1.3E-02          2.8E-02          1.3E-02
                   1.5E-06           17               92               986
                      2              351

22:48----23:18     1.7E-02         3.9E+00          2.3E+00          8.2E-01
                   4.2E-02         1.1E-02          3.1E-02          1.2E-02
                   1.0E-06           17               94               986
                      3              344

23:03----23:33     1.4E-02         4.2E+00          2.1E+00          8.0E-01
                   3.8E-02         7.2E-03          3.0E-02          1.2E-02
                   1.0E-06           17               95               988
                      3              355

23:18----23:48     1.2E-02         4.0E+00          2.3E+00          8.0E-01
                   3.5E-02         7.3E-03          2.6E-02          1.3E-02
                   1.0E-06           16               96               988
                      3                2

23:33----00:03     1.2E-02         4.3E+00          2.7E+00          8.1E-01
                   3.7E-02         5.9E-03          3.0E-02          1.2E-02
                   1.0E-06           16               97               988
                      3               23

23:48----00:18     2.1E-02         5.1E+00          3.0E+00          8.0E-01
                   3.6E-02         5.2E-03          3.1E-02          1.2E-02
                   1.0E-06           16               99               988
                      2               30

00:03----00:33     3.7E-02         5.3E+00          3.4E+00          8.1E-01
                   3.6E-02         8.9E-03          2.7E-02          1.1E-02
                   1.0E-06           16              101               988
                      2               23

00:18----00:48     3.9E-02         4.2E+00          3.0E+00          8.0E-01
                   3.8E-02         1.1E-02          2.6E-02          1.1E-02
                   1.0E-06           16              103               988
                      3               24

00:33----01:03     2.6E-02         4.1E+00          2.3E+00          7.5E-01
                   3.0E-02         1.1E-02          2.0E-02          1.2E-02
                   1.0E-06           15              105               989
                      3               10

00:48----01:18     3.1E-02         4.2E+00          2.3E+00          7.6E-01
                   2.6E-02         1.0E-02          1.6E-02          1.2E-02
                   1.0E-06           15              105               989
                      4               13
      TIME             H2S            THC           THC-CH4          CH4
                       NOX            NO2             NO            OZONE
                    SOLAR RAD         TEMP          HUMIDITY      BAROMETER
                    WIND SPEED   WIND DIRECTION

01:03-----01:33      4.0E-02        5.0E+00         2.6E+00        7.8E-01
                     2.3E-02        9.4E-03         1.6E-02        1.3E-02
                     1.0E-06          15              105            989
                        4             19

01:18-----01:48      3.0E-02        4.9E+00         2.7E+00        7.8E-01
                     2.3E-02         1.0E-02         1.5E-02        1.3E-02
                     1.0E-06          15              105            989
                        3              6

01:33-----02:03      2.3E-02        3.8E+00         2.6E+00        7.7E-01
                     2.3E-02        1.1E-02         1.3E-02        1.4E-02
                     1.0E-06          14              106            989
                        3             11

01:48-----02:18      1.9E-02        3.9E+00         2.5E+00        7.7E-01
                     1.7E-02        8.0E-03         9.7E-03        1.5E-02
                     1.0E-06          14              107            989
                        3              6

02:03-----02:33      1.5E-02        3.9E+00         2.4E+00        7.7E-01
                     1.3E-02        4.8E-03         8.9E-03        1.5E-02
                     1.0E-06          14              109            989
                        2             342

02:18-----02:48      1.2E-02        4.3E+00         2.5E+00        7.7E-01
                     1.4E-02        4.9E-03         9.1E-03        1.4E-02
                     1.0E-06          14              111            989
                        1             334

02:33-----03:03      1.1E-02        5.4E+00         3.1E+00        8.0E-01
                     2.1E-02        9.7E-03         1.1E-02        1.3E-02
                     1.0E-06          13              114            989
                        1             341

02:48-----03:18      9.7E-03        6.7E+00         3.7E+00        8.4E-01
                     2.3E-02        1.0E-02         1.3E-02        1.3E-02
                     1.1E-06          13              114            989
                        0             343

03:03-----03:33      8.9E-03        6.5E+00         3.3E+00        8.3E-01
                     2.2E-02        7.7E-03         1.4E-02        1.2E-02
                     1.1E-06          13              116            989
                        0             349

03:18-----03:48      8.2E-03        6.1E+00         3.6E+00        8.5E-01
                     2.9E-02        1.3E-02         1.7E-02        7.5E-03
                     1.2E-06          12              121            989
                        0              9

03:33-----04:03      7.4E-03        5.9E+00         4.4E+00        9.3E-01
                     3.6E-02        1.5E-02         2.1E-02        4.0E-03
                     2.3E-06          11              128            990
                        0             50
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ESPANOLA #36, CONT'D

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       TIME               H2S              THC             THC-CH4           CH4
                          NOX              NO2               NO             OZONE
                       SOLAR RAD          TEMP            HUMIDITY        BAROMETER
                      WIND SPEED   WIND DIRECTION

  03:48-----04:18       6.7E-03         4.6E+00          3.3E+00          8.6E-01
                        3.6E-02         1.2E-02          2.4E-02          4.1E-03
                        5.9E-06            11              133              990
                           0               97

  04:03-----04:33       6.2E-03         4.3E+00          2.7E+00          8.1E-01
                        3.5E-02         1.0E-02          2.4E-02          4.4E-03
                        8.8E-06            10              136              990
                           0              222

  04:18-----04:48       5.6E-03         4.4E+00          2.7E+00          8.0E-01
                        3.4E-02         1.1E-02          2.4E-02          5.1E-03
                        1.2E-05            10              138              990
                           0              226

  04:33-----05:03       5.1E-03         4.0E+00          2.3E+00          7.6E-01
                        2.9E-02         8.8E-03          2.2E-02          7.1E-03
                        2.0E-05            10              140              990
                           0              258

  04:48-----05:18       4.9E-03         3.4E+00          2.0E+00          7.4E-01
                        2.2E-02         4.4E-03          1.7E-02          7.7E-03
                        2.1E-05            10              141              990
                           0              265

  05:03-----05:33       4.5E-03         3.3E+00          2.2E+00          7.6E-01
                        1.9E-02         4.3E-03          1.4E-02          7.3E-03
                        2.8E-05            10              141              990
                           0              270

  05:18-----05:48       4.2E-03         3.3E+00          2.2E+00          7.7E-01
                        1.9E-02         5.8E-03          1.4E-02          6.5E-03
                        7.8E-05             9              142              990
                           0              269

  05:33-----06:03       3.9E-03         3.4E+00          2.0E+00          7.7E-01
                        1.8E-02         6.0E-03          1.3E-02          6.4E-03
                        2.9E-04            10              142              990
                           0              265

  05:48-----06:18       3.7E-03         3.4E+00          2.0E+00          7.9E-01
                        1.6E-02         3.7E-03          1.2E-02          7.1E-03
                        7.2E-04             9              143              990
                           0              258

  06:03-----06:33       3.6E-03         6.3E+00          3.7E+00          9.6E-01
                        1.8E-02         5.8E-03          1.2E-02          7.3E-03
                        1.4E-03            10              143              991
                           0              264

  06:18-----06:48       3.5E-03         7.9E+00          4.5E+00          8.9E-01
                        2.1E-02         8.4E-03          1.4E-02          5.7E-03
                        1.8E-03            10              141              991
                           0              280
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      TIME            H2S              THC             THC-CH4            CH4
                      NOX              NO2               NO              OZONE
                   SOLAR RAD           TEMP           HUMIDITY         BAROMETER
                  WIND SPEED     WIND DIRECTION

06:33----07:03      3.1E-03          5.9E+00          3.4E+00          8.6E-01
                    2.1E-02          8.6E-03          1.4E-02          6.1E-03
                    2.2E-03            10               140              991
                       0               274

06:48----07:18      3.0E-03          4.4E+00          2.7E+00          8.4E-01
                    1.9E-02          7.0E-03          1.3E-02          5.5E-03
                    4.1E-03            10               141              991
                       0               282

07:03----07:33      3.0E-03          3.6E+00          2.2E+00          7.9E-01
                    1.9E-02          7.9E-03          1.4E-02          5.0E-03
                    6.3E-03            11               137              991
                       0               279

07:18----07:48      2.8E-03          3.7E+00          2.2E+00          7.8E-01
                    1.9E-02          6.7E-03          1.5E-02          5.7E-03
                    7.1E-03            12               131              991
                       0               256

07:33----08:03      3.0E-03          5.2E+00          2.9E+00          8.3E-01
                    2.0E-02          4.6E-03          1.6E-02          7.0E-03
                    7.5E-03            13               124              991
                       0               232

07:48----08:18      7.6E-03          5.6E+00          3.3E+00          8.5E-01
                    2.3E-02          8.3E-03          1.6E-02          1.1E-02
                    8.5E-03            15               108              991
                       1               15

08:03----08:33      1.6E-02          4.9E+00          2.8E+00          8.1E-01
                    2.1E-02          1.2E-02          1.1E-02          1.6E-02
                    9.0E-03            17               92               991
                       4               16

08:18----08:48      1.3E-02          4.5E+00          2.3E+00          7.8E-01
                    1.6E-02          8.7E-03          8.7E-03          1.7E-02
                    9.5E-03            17               88               991
                       5               16

08:33----09:03      6.2E-03          3.7E+00          2.3E+00          7.7E-01
                    1.4E-02          4.0E-03          9.8E-03          1.8E-02
                    1.2E-02            17               89               991
                       5               11
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                              STATISTICS

NUMBER OF READINGS 644

POLLUTANT                  MINIMUM    MAXIMUM   ARITHMETIC  STANDARD  GEOMETRIC  GEOMETRIC
                            VALUE      VALUE      MEAN      DEVIATION   MEAN     STD. DEV.

H2S                        2.15E-03   9.32E-02   1.26E-02   1.24E-02   8.82E-03   2.27E+00
THC                        3.01E+00   3.04E+01   4.55E+00   3.05E+00   4.07E+00   1.50E+00
THC-CH4                    1.77E+00   1.98E+01   2.72E+00   1.71E+00   2.47E+00   1.47E+00
CH4                        6.89E-01   1.70E+00   8.03E-01   1.10E-01   7.97E-01   1.12E+00
NOX                        9.62E-03   9.77E-02   2.52E-02   1.30E-02   2.25E-02   1.60E+00
NO2                        1.00E-06   1.01E-01   8.33E-03   1.01E-02   5.05E-03   2.21E+01
NO                         4.26E-03   1.19E-01   1.74E-02   1.10E-02   1.47E-02   1.77E+00
OZONE                      5.96E-04   1.86E-02   1.04E-02   4.20E-03   9.38E-03   1.65E+00
SOLAR RAD                  1.00E-06   1.99E-02   2.19E-03   4.27E-03   3.54E-05   4.50E+01
TEMP                              9         18         13          3
HUMIDITY                         84        144        116         19        114          1
BAROMETER                       988        991        990          1        990
WIND SPEED                        0         13          2          2          0         21
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                                         ESPANOLA #37


DATE:                JUL 16 1978
SCAN TIME:           60    SEC
AVERAGING TIME:      30    MIN
LOCATION: THORNLOE & READ STS.(04408-51229); 0.9KM & 180DGS/SRC

       TIME            H2S              THC            THC-CH4           CH4
                       NOX              NO2              NO             OZONE
                    SOLAR RAD          TEMP           HUMIDITY        BAROMETER
                    WIND SPEED    WIND DIRECTION

09:26----09:56        4.5E-02         4.8E+00         3.3E+00         8.6E-01
                      4.1E-02         1.7E-02         2.5E-02         1.4E-02
                      5.0E-02            23              66              991
                         7               21

09:36----10:06        1.9E-02         4.4E+00         2.9E+00         7.9E-01
                      3.3E-02         1.3E-02         2.2E-02         1.6E-02
                      5.8E-02            25              58              991
                         7               24

09:46----10:16        2.9E-02         4.3E+00         2.8E+00         7.8E-01
                      3.4E-02         1.3E-02         2.3E-02         1.6E-02
                      4.5E-02            24              60              991
                         7                9

09:56----10:26        3.2E-02         4.9E+00         3.1E+00         8.0E-01
                      3.8E-02         1.6E-02         2.7E-02         1.5E-02
                      2.9E-02            22              67              991
                         7              352

10:06----10:36        3.8E-02         4.5E+00         2.9E+00         8.0E-01
                      3.4E-02         1.7E-02         2.2E-02         1.5E-02
                      2.7E-02            20              75              991
                         6              347

10:16----10:46        2.7E-02         4.5E+00         3.0E+00         8.1E-01
                      3.4E-02         1.8E-02         2.1E-02         1.6E-02
                      4.2E-02            22              72              991
                         6                7
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                           STATISTICS

NUMBER OF READINGS 88

POLLUTANT          MINIMUM    MAXIMUM    ARITHMETIC  STANDARD  GEOMETRIC  GEOMETRI
                   VALUE      VALUE      MEAN        DEVIATION MEAN       STD. DEV

H2S                1.11E-02   1.86E-01   3.41E-02    3.26E-02  [illegible].52E-02  2.05E+0
THC                3.00E+00   2.46E+01   4.65E+00    3.03E+00  [illegible].17E+00  1.50E+0
THC-CH4            1.79E+00   1.27E+01   4.05E+00    2.07E+00  [illegible].66E+00  1.6[illegible]E+0
CH4                6.97E-01   1.69E+00   8.15E-01    1.55E-01  [illegible].08E-01  1.[illegible]E+0
NOX                8.44E-03   1.71E-01   3.61E-02    2.04E-02  [illegible].70E-02  2.[illegible]E+0
NO2                1.00E-06   1.60E-01   1.60E-02    2.79E-02  [illegible].81E-04  6.[illegible]E+0
NO                 3.97E-03   8.29E-02   2.36E-02    2.12E-02  [illegible].62E-02  2.[illegible]E+0
OZONE              6.26E-03   1.97E-02   1.55E-02    3.19E-03  [illegible].51E-02  1.[illegible]E+0
SOLAR RAD          1.46E-02   7.51E-02   4.53E-02    2.[illegible]E-02  [illegible].89E-02  1.[illegible]E+0
TEMP                 18         31         23          4
HUMIDITY             47         177        66          15        65          1
BAROMETER            991        992        991         0         991         1
WIND SPEED           1          14         7           3         6           2
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